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Farm Dairy Instruction.

Features of National Scheme.

G. M. Valentine, Assistant Director of Dairy Division.

BY the decision of the Government to establish farm dairy instruction on a Dominion basis, effect has been given to the request which has been made for many years at representative meetings of those engaged in all branches of the industry. Those having a knowledge of the position will receive the decision with great satisfaction, as experience has shown that the work of the Farm Dairy Instructor is a necessary link in the chain which has for its aim the production of the sound raw material on which high-standard produce with good keeping-quality depends.

In the early days of the industry, when all milk was delivered by the owner directly to the cheese-factories and creameries, the manager acted as an adviser to the suppliers, and in many cases visited the farms and assisted to locate the cause of any defect found in the milk. Under these conditions a definite spirit of co-operation between the suppliers and the manager was cultivated, and it could be said that in many cases the quality of the product made was the result not of the skill of the butter or cheese maker or of the elaborate nature of the plant at his disposal, but of the determination of the district as a whole to keep their product at the highest possible point.

Personal Contact Lost.

Those were the days of small things, and although this same spirit still exists in many districts a number of factors have altered the position considerably. Among these are increased outputs, multiple factories under one ownership, and home separation, all tending to break down the pride which was formerly associated with local ownership and control. Under these changed conditions there is not the personal contact between the manager and supplier which makes the approach to the question of quality of the milk or cream an easy one, and even if the larger outputs and scattered areas from which supplies are received do not make it possible, it is questionable whether, except in very unusual circumstances, it is desirable that the manager should undertake this work.

In 1896 two officers of the Dairy Division were appointed to give special attention to the conditions on dairy-farms, and in 1908 a number of Inspectors were appointed to carry out the work which is now done by Farm Dairy Instructors, but the services of the latter were not long retained, an indication that the industry did not realize the necessity for such work or the benefits to be derived from it. It was, however, continued by the Instructors of the Dairy Division as time permitted, and in 1910 an officer of the Division was appointed to specialize in this work at the request of a number of dairy companies in the Stratford district.

Kaupokonui's Example.

In 1912 the first appointment of an officer of the Division who devoted his whole time to the service of one dairy company was made, his duties including inspection of dairy-farms and herd-testing. This appointment was made at the request of the Kaupokonui Dairy Co., which undertook to pay the full salary and all expenses of transport. The officer appointed to fill the position took up his duties on 5th November, 1912, and the arrangement then entered into has been continued up to date with minor alterations in the conditions.

Representatives of individual dairy companies travelling among suppliers and giving assistance and advice had prior to this time acted more or less as instructors. The directors of the Kaupokonui Dairy Co. recognized, however, that without some official status being held by the officer making the visit it was almost impossible to get the necessary improvements carried out on those farms where the owner refused to accept the suggestions of dairy-company employees.

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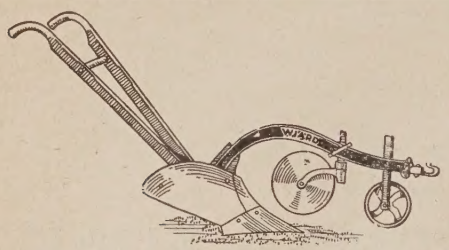

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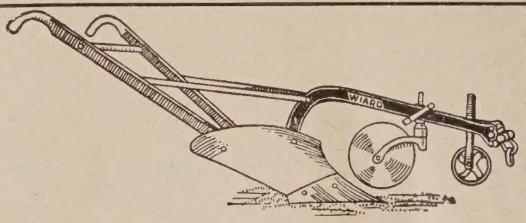

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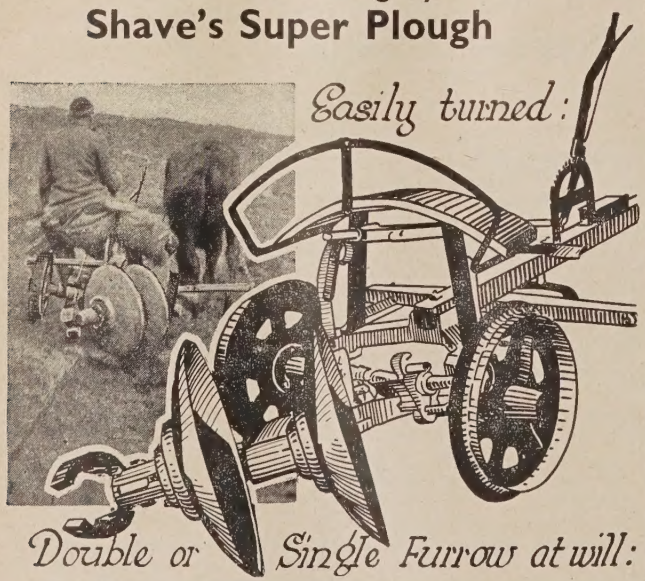

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In order to meet such a position, the appointment was made with the understanding that the Department should have control of the officer, who would have official status similar to other members of the Division. This condition has applied to all appointments made since by the Dairy Division.

The season of 1912–13 covered a period in which the installation of milking-machines proceeded rapidly, and the releaser plant was replacing many bucket machines. Both were erected with black iron air-pipes which were difficult to clean, and the quality of the milk suffered. It was, no doubt, this drop in milk quality which influenced the Kaupokonui directors in their decision to ask for the appointment of a Farm Dairy Instructor with official status.

Condition of Milking-machines.

During the autumn of 1913 all Cheese and Butter Instructors were asked by the Director of the Dairy Division to concentrate on the inspection of milking-machines, and during that period six hundred machines in all parts of the Dominion were reported on. Of these, 23 per cent. were found to be in good condition, 27 per cent. were fair, and 50 per cent. were bad.

These figures were placed before the 1913 meeting of the National Dairy Association, and would probably be in line with the position which would obtain to-day in those districts which have not had the benefit of farm dairy instruction. They brought out two points: the need for instruction work on the farms, and the necessity for the use of tinned brass piping in fitting up the air system in all milking plants. It had been clearly demonstrated that in order to produce high-quality milk with a milking-machine it was just as necessary to have a clean air system as a clean milk system.

It can be readily understood that, after the unfavourable experience of the attempt to put farm inspection into operation in 1908, the Government of the day did not feel inclined to accede to the demand which was made by resolution at the 1913 meeting that action be taken to remedy these faults. An intimation was given, however, that sympathetic consideration would be given to requests received from any dairy company or group of dairy companies which applied for the appointment of men with official status to carry out this work, and this offer was availed of by a number.

Voluntary Grading.

In the spring of 1914 there was inaugurated in the North of Auckland a scheme for the voluntary grading of all cream received at the creameries in that area, with safeguards to prevent the transfer of supply between the months of August and May inclusive in any year, and providing for differential payments. The infliction of the penalty for inferior-quality cream created a demand from the suppliers for assistance in locating the cause, and the appointment of a Farm Dairy Instructor, in some cases without official status, but in most cases with it, was a very natural result.

The sincerity of the North Auckland group of dairy companies in their endeavours to improve the quality of their butter is shown by the fact that the agreement entered into in 1914 still continued in 1926, when compulsory grading of cream was brought in by regulation. During that period most of the creameries in North Auckland had introduced farm dairy instruction, and at the time of writing the whole of that area is covered by this service with the exception of one creamery, which was unable to link up with any other creamery to secure it.

These two factors, combined with a change from an alternate day delivery to a daily delivery of cream, have raised the reputation of North Auckland butter from one of the lowest average grading districts to a position second to none in the Dominion.

Demand for Instructor.

During the same period cream grading with or without farm dairy instruction had gained considerable ground in New Zealand, and at one time a large part of New Zealand had been covered by the service, but the South Island, except in two instances in Marlborough and Nelson, did not long retain either system. In addition to Kaupokonui, a number of other dairy companies in the North Island have retained the service without a break, and in some cases under the same officer since 1916–20.

Following the first few appointments, the conditions under which applications for the service would be considered were stabilized as follows:—

(1) The Department to appoint the officer and exercise supervision and control of appointee.

(2) The dairy companies concerned to provide suitable locomotion and travelling and locomotion expenses.

(3) The dairy companies concerned to refund to the Department equal monthly payments aggregating one-half of the salary of the officer appointed at £320 per annum.

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(4) Where the number of suppliers on the programme of the Farm Dairy Instructor is less than five hundred, the amount of departmental assistance would be in that proportion of one-half of the salary which the number of suppliers bears to five hundred.

(5) If the dairy companies wish to withdraw from the scheme they must notify the Department prior to 31st January in any one year of their intention not to continue for the succeeding year, commencing from the next 1st August thereafter.

Influence of Seasons.

The number of officers engaged in the work has fluctuated considerably from time to time, the depression years being responsible for a number of withdrawals. A remarkable feature of the scheme, however, has been the number of instances in which applications for reinstatement of the service have been made. This has been noticeable in abnormal seasons, such as the one just experienced. The hot weather resulted in an inferior quality of milk and cream being received at the factories and provided strong argument in favour of supervision on the farms. The number of officers engaged in the work before the recent appointments was forty-two, a clear indication of the appreciation of the service, which actually covers the greater part of the production of the Dominion.

The system had both advantages and disadvantages, but has laid the foundation for the larger scheme which has now been established.

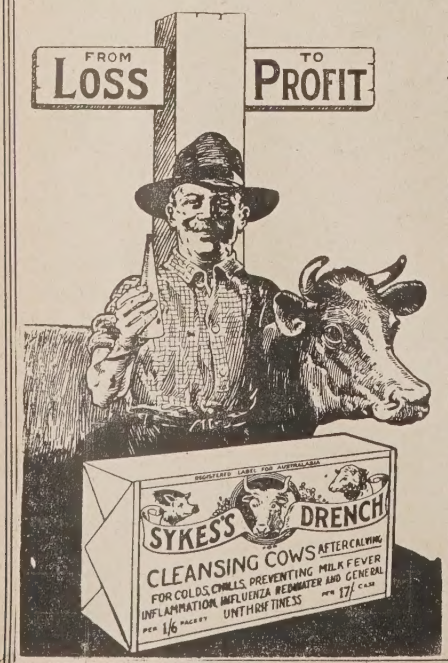
While the dairy companies will lose a certain amount of the control over an officer's movements which they have exercised in the past, a close contact must still be maintained in order to ensure that the time expended will be devoted to those suppliers most in need of assistance.

Against that there is the very material advantage that, as the service is Dominion-wide, all suppliers will be put on the same footing, while the overlapping, which was inseparable from the original scheme, will be avoided.

Principal Aim.

The principal aim of farm dairy instruction is improvement in quality, and, while it is necessary in some cases to exert the official authority which the appointment carries with it, the majority of the suppliers regard the Instructor as a welcome visitor who can help them in any difficulty which they may have in maintaining the highest quality of milk or cream, who can assist them with milking-machine and separator problems, can advise them regarding the proper layout of any work which may be required in connection with the dairy, the best way to carry out the work, and the probable cost. The Farm Dairy Instructor is also required to see every milking-machine installation in his district, thus ensuring that it complies with the requirements of the Dairy Regulations before a clearance is given to the vendor by the purchaser.

Probably the most frequent duty which the Farm Dairy Instructor is called upon to carry out is instruction in the proper method of cleaning a milking-machine. This does not mean that he is responsible for the actual cleaning of all the milking-machines in his district, as would seem to be the attitude of some suppliers. One practical demonstration of the correct procedure on each farm where such is required is all that can be undertaken. On the other hand, experience has shown that the belief that after one demonstration all suppliers will thereafter require no further attention is not borne out by experience; hence the necessity for a continuous service.



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Experience of Instructors.

In order to carry out his duties successfully, it is obvious that the officer appointed should have a general knowledge of dairying, and for this reason only those who have had some years of experience in dairy-factory work, in most cases as managers, have been considered in making the appointments.

In addition to the question of improving the quality of milk and cream, it is fully recognized by dairy companies that there are matters which arise between the management and the suppliers which are best dealt with by some one having no personal interest in either and the authority to require necessary alterations to be carried out for the improvement of conditions on the farm. While suppliers generally are reluctant to draw attention to defects they know to exist in the equipment and methods followed by their neighbours, it is general experience that suppliers waste little sympathy on offenders when steps are taken to bring them up to a standard which will ensure the quality of the finished article turned out at the factory in which they are mutually interested.

At the same time, it must be remembered that defects are sometimes found when grading milk and cream which cannot be traced to any obvious lack of care on the farm. In these cases the Farm Dairy Instructor must practically assume responsibility for the solution of the problem, providing the supplier is prepared to render all necessary assistance.

Under the voluntary scheme the contribution made by the Government was approximately 30 per cent. of the total cost, and the amount to be collected from each contributing dairy company in a group was assessed on the amount of butterfat received during the previous year. This was not in all cases an equitable basis, as some companies had a large number of small suppliers which entailed a large number of visits, while others had a few large suppliers requiring a comparatively small amount of supervision.

Basis of Payment.

In order to place the assessment on a more equitable basis, the contribution to what must now be regarded as a Dominion fund as distinct from a local fund in the past has been calculated on a supplier plus butterfat basis. Under this scheme one-half of the levy of 60 per cent., representing 30 per cent. of the total cost, will be collected on a supplier basis, and will amount to 4s. per supplier per year. This amount will be based on the maximum number supplying during August, September, or October in each year, and will be collected with the November payment. The other half of the levy will be based on butterfat, and will amount to 0·008d. per pound of fat received during the current month, and will be collected monthly. The balance of 40 per cent. of the total cost will be borne by the Consolidated Fund.

It has frequently been stated that the work of the Butter and Cheese Instructors commenced at the wrong end of the business, dealing chiefly, as it does, with the manufacture of the finished article. It must be remembered, however, that the object in view when the first appointments of Instructors were made was the dissemination of information on the establishment of dairy factories in pursuance of a definite policy to foster the industry which had been laid down by the Government of the day. It was only after the establishment of the grading of butter and cheese some years later that the call for instruction in manufacture became a matter of importance.

Wide Margin.

The grading provided evidence of the wide margin between the best and the poorest quality of both products, a position due to the lack of experience and training on the part of those appointed to manage the dairy factories established. It must be obvious that more immediate results could be obtained by making instruction available to the comparatively small number of managers than from attempting to provide farm dairy instruction to the much greater number of suppliers. Moreover, as already stated, a certain amount of instruction to suppliers was undertaken by managers and Dairy Instructors, both from the receiving-platform and by visits to farms.

The expansion of the industry, largely on home-separation lines, and the adoption of compulsory grading with differential payments, made farm dairy instruction a necessary link in the chain of Government supervision, which can now be claimed to embrace all dairies and to cover every stage from the farm to the disposal of the finished article.

Under the present scheme there will be seventy-seven officers engaged in the work, fifty-five being located in the North Island and twenty-two in the South Island. Each officer will have approximately nine hundred suppliers on his programme, the number varying slightly with the intensity of dairying in the district in which he is working and the size of the herds.

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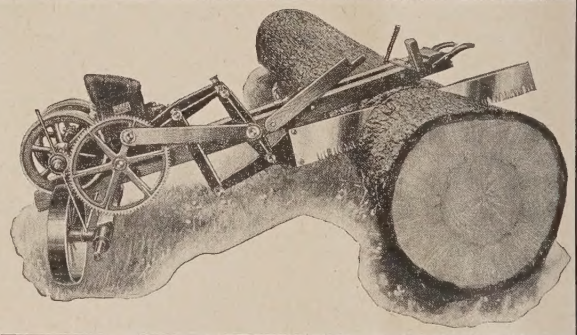

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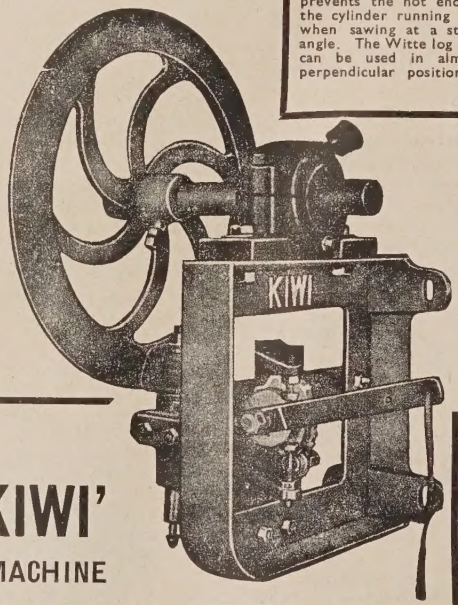

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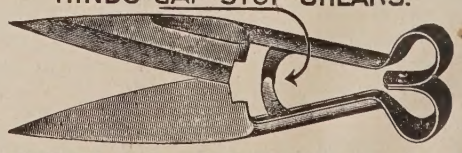

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Germination of Ragwort in Water.

Important Discovery Made in Seed Experiments.

A. L. POOLE, Botanist, Plant Research Bureau.

THAT ragwort seed will germinate quickly and easily in water was an unexpected and important discovery made during investigations at the Ruakura Experimental Farm into the part played by water—streams, rivers, and lakes—in the distribution of the seed. This is of such great interest that this preliminary note has been written, although the results of further work on the matter will be published later.

This discovery was first made by placing seed in a beaker of water to see whether it would sink or float. It was left there, and after three days it was noticed that germination was beginning. By the fifth day germination was well advanced and a number of cotyledons were fully open, and on the fourteenth day a 70-per-cent. germination, which did not later increase, had taken place. Most of the seeds sank to the bottom of the beaker just before germination, but rose to the surface of the water again when the cotyledons were fully open.

Fig. 1.—The lower reaches of the Waipa River, showing the sluggish current and the willow-lined banks.

Period of Germination.

A number of experiments are being conducted to work out the various aspects which this finding has opened up, and some of the preliminary results make interesting reading. Most of the germination takes place in three to five days, and the percentage is high, being equivalent to seed laboratory tests (50 per cent. to 80 per cent.). Cotyledons have remained alive—and are still quite fresh—in tap water for three months. They have grown slightly, but have retained their seed leaves and made no attempt to put forth true leaves.

This quick and easy germination of the seed in contact with water has a wide practical bearing, and the study of the ragwort population along stream and river beds arising in ragwort country and the margins of lakes and ponds near ragwort infestations acquires an added interest. The effect on the transport of seed by rivers is far reaching, and in this connection the distribution of ragwort along the banks of the Waipa River is of interest.

Course of the River.

This river has its source about thirty miles south-east of Otorohanga, in the Rangitoto Mountains, where a number of small streams quickly swell its waters. It flows through Otorohanga, where it is joined by large tributaries from south of Te Kuiti and from Waitomo. It then meanders in a northerly direction through Pirongia and Whatawhata, and joins the Waikato River at Ngaruawahia, collecting on the west small tributaries and on the east a number of large ones which drain an extensive catchment area to within a comparatively few miles of the Waikato.

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Above Otorohanga the river flows fairly rapidly in a shallow shingle-bed, with wide shingle-banks and flood-plains here and there. A few miles north of Otorohanga it flows in a well-defined bed, with steep silty banks 20 ft. or more above the normal flow. From here to its junction with the Waikato the river is the same; a dense growth of willows lines the bed, and in no place does it overflow the top banks. In its lower reaches the flow becomes very sluggish (Fig. 1).

Heavily Infested Country.

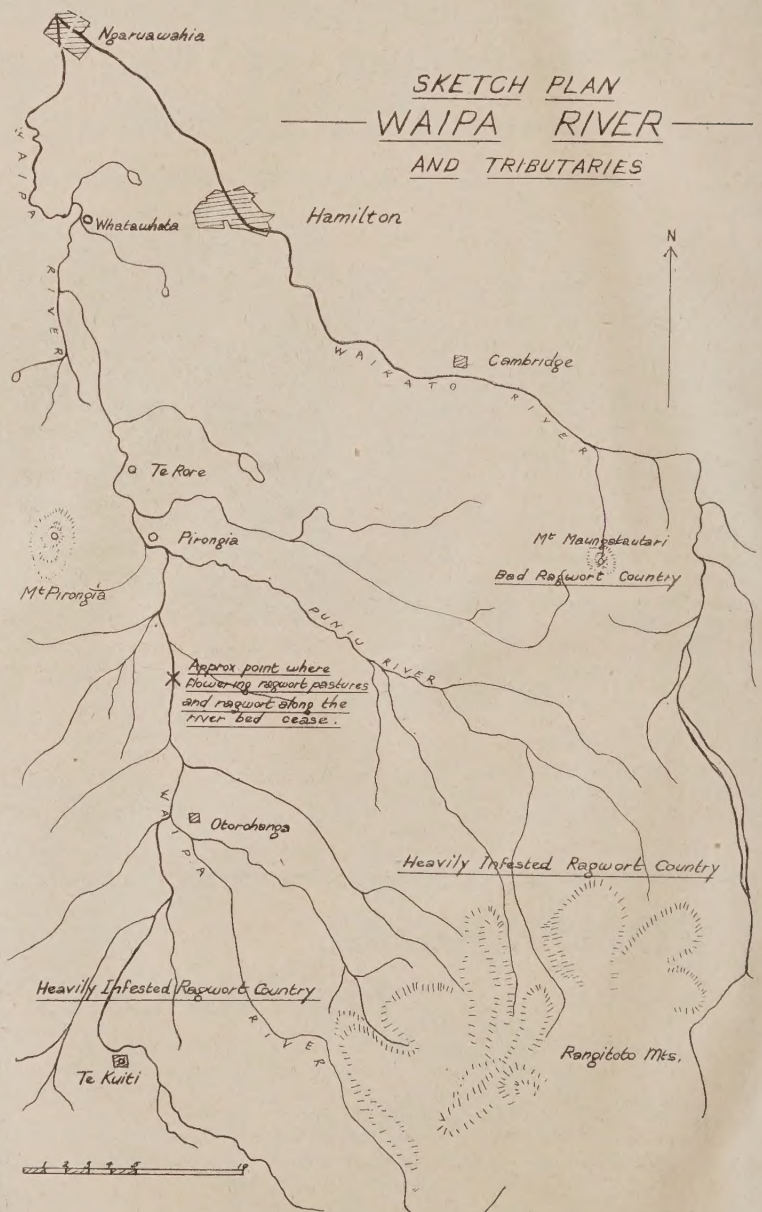
The greater part of the outskirts of the extensive catchment area of the river and tributaries comprises heavily infested ragwort country, including the notoriously bad country around Te Kuiti, Otorohanga, Maungatautari, and other adjacent areas. Plentiful flowering ragwort is to be found in the pastures immediately above the river-banks up to a point about five miles south of Pirongia, but from here to its junction with the Waikato very little is to be seen.

Along the actual sides of the river-bed and the edge of the river itself a large number of seedling and small rosette plants are to be found to approximately the same point as the flowering plants in the pastures on top of the river-banks. Below this point they are very scattered, and near Ngaruawahia it is very difficult to find any.

Thus, ragwort-plants along the sides and edge of the river cease about the same time as the flowering plants—or, in other words, the source of seed supply—cease in the pastures above the river. In finding an explanation for this two things in particular must be borne in mind: first, that in the lower reaches the river is sluggish and does not overflow the upper banks, and, secondly, that ragwort seed germinates readily in water.

Carriage by Wind and Water.

Therefore, where there is a plentiful supply of flowering ragwort along the banks of the river much seed would be blown for a short distance on to the water. These would not travel very far in the sluggish current before being caught up by willows along the edge. They would quickly germinate, and, if suitable root-holds were obtained, would develop, but, because of the shade and difficult conditions of growth, they would not reach flowering size before being destroyed by floods. The infestation along the river-bed could not, therefore, extend far below the source of seed-supply.



In the upper reaches of the river (south of Otorohanga) the matter would be different. Here it is fast-flowing and has extensive flood-plains. Seed would be carried along quickly by the water, and in times of flood would be deposited on the surrounding country and left to germinate. There is so much flowering ragwort near this country, however, that it would be impossible to sort out the effect of the two separate factors of water and wind carriage of the seed in the commencement or continuation of an infestation.

Further accurate observations of the ragwort population along river-banks will throw much light upon the part they play in the encroachment of this weed into clean country.

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Method of Manufacture on the Farm.

W. L. Harbord, Instructor in Agriculture, Invercargill.

With the cost of posts for fencing purposes becoming increasingly higher, some farmers are manufacturing their own concrete posts, the cost of which compares not unfavourably with that of wooden posts, providing the locality is one rich in the supply of readily accessible sand and gravel. If his system of work is haphazard the farmer will find his concrete post an expensive item, but if a method similar to the following description is used in the manufacturing process the concrete post will be a thing of everlasting strength and durability, and will be comparatively inexpensive.

Shaking-table or Vibrator.

Concrete posts are made on the property of Messrs. D. McRae and Sons, Benmore, Southland, and the idea adopted is both ingenious and rapid. The property is situated near a good bed of the ideal sandy gravel mixture, and as this requires no mixing the cost of labour is conveniently reduced.

A steel mould is used (Figs. 1 and 3), and this is made in such a manner that it can be lifted away from the concrete easily and quickly so that the post is left sitting on an oiled board for setting. The mould, not including the bottom, is made of two separate sides, which are held to the board by means of fixable metal ends and spring clips as shown in Fig. 1. Although many oiled boards have to be kept for this purpose, only wo moulds are used, one being lifted away from the post while the other is being filled with the mixture.

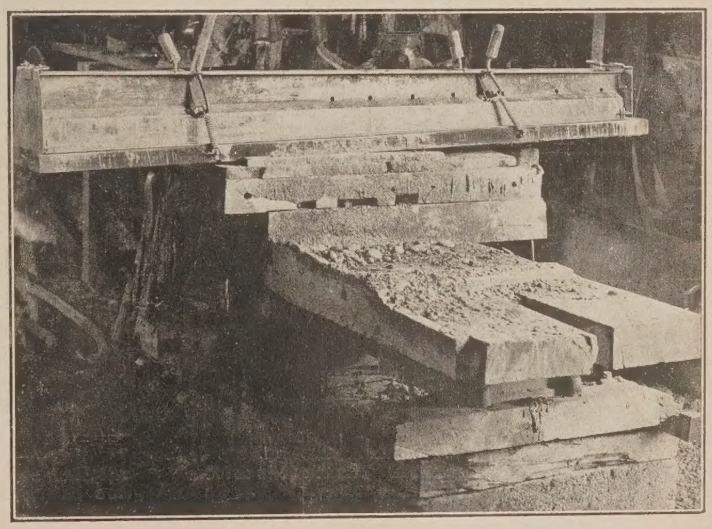

Fig. 1.—The post mould resting on the vibrator.

Method of Construction.

When being filled with concrete the mould sits on top of a vibrator, or shaking-table. This consists of a table, or bench, built on to the old shaft of a vacuum pump (Fig. 2). This shaft is driven by a belt running off a petrol motor, and the spin of the shaft causes a fast vibration of the table. With the table vibrating, the mixture is shovelled into the mould. The vibration causes good, even, and level filling, and also causes the initial set of the concrete to take place almost immediately. The mould filled, it is lifted off the table on to a convenient trolly and the other mould is placed in readiness for filling.

The best results so far have been obtained with four men working, two filling, and two carrying away and releasing the posts from the mould, and between twenty and twenty-five posts have been turned out in the hour with this method. Mr. McRae considers, however, that with a little careful readjustment of his plant this number could be doubled.

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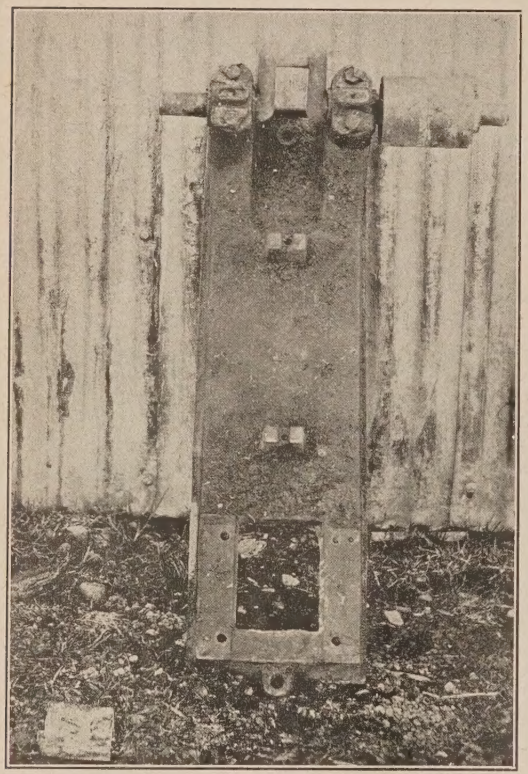

Fig. 2.—Part of an old vacuum pump, on top of which is built the vibrator table. The shaft is driven by a belt on the pulley shown.

Fig. 3.—One of the oiled boards and a post mould attached to a board ready for filling. At the bottom are shown the outside mould and plug for making drain-pipes.

Light iron rods are used for reinforcing, and with this method thirteen posts can be made per bag of cement. Such posts can be handled and put into the ground on the third day after they have been made without fear of breaking.

Concrete Drain-pipes.

Concrete drain-pipes are made by the same method as is used in the manufacture of concrete posts. The mould and plug are shown in Fig. 3, and this is also clipped to an oiled board. The whole is placed on the vibrator while being filled, and the mould and plug can be removed immediately, leaving the pipe to set on the oiled board. Fifty 6 in. pipes can be made from the one bag of cement, and as many as seventy-five pipes have been made in one hour. Mr. McRae considers that this figure could also be doubled.

When making concrete strainer-posts on this farm the concrete was made at the work-shed and then placed in drums to be carried in a cart across the paddocks to the hole dug in readiness for the post. Mr. McRae noticed that, due to the vibration and shaking received in the cart, the concrete was always set so hard that crowbars had to be used to force it out of the drums, and from this he conceived his idea of a vibrator.

I wish to thank Messrs. D. McRae and Son for supplying this knowledge.

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Poisoning of Cattle.

Black (or Garden) Nightshade.

W. G. Bonner, Inspector of Stock, Te Kuiti.

THERE does not appear to be any recorded case in New Zealand of fatal poisoning of cattle caused by eating black nightshade. Mr. B. C. Aston, in his article, "The Poisonous and Medicinal Plants of New Zealand," *Journal of Agriculture*, March, 1923, gives the following information with reference to black nightshade: "*Solanum nigrum* is widespread throughout the world. Cases of poisoning in stock, calves, sheep, goats, and pigs are recorded in other countries." The writer has come across one case in New Zealand in which lambs confined to a paddock on which was a large aftermath growth of *S. nigrum* went off in condition and a number died.

Case in Te Kuiti District.

The recording of the following case among cattle, which occurred in the Te Kuiti district in April of this year, will be of interest:—

Seven cows which had been on the road for two or three days were put into a holding paddock on a Friday night. The holding paddock of about 8 acres had had a crop of potatoes taken off it, and had not been sown down. Consequently, it was full of all kinds of rough feed and weeds, among which was an abundance of black nightshade. When the owner went to muster the cows on the Monday morning he found one dead, two down and only semi-conscious, and the other four showing signs of poisoning (staggers and delirium). An inspection of the paddock showed that the nightshade plants were heavily cropped by the cows. Plants that were not easily accessible to the cattle were seen to be fairly heavily laden with green berries.

Specimens of the plants, showing the stem, the leaves, the flower, and the berries, both green and ripe, were forwarded to the Plant Research Bureau for identification. Mr. H. H. Allen, Government Botanist, confirmed the plants as being the nightshade, and as possibly being responsible for poisoning the cattle.

Black (or garden) nightshade.

Symptoms and Examination.

The ante-mortem symptoms of the affected animals were staggers and delirium. Later they went down, lapsed into semi-consciousness, and later stretched out on the side. Periodically they were seized with convulsions, with an occasional clamping of the jaws. One of the cows was killed and a post-mortem made; the other died a few hours later, and two more the next day.

The post-mortem examination revealed little. All organs were apparently normal, with the possible exception of the fourth stomach, which may have been a trifle inflamed. The fourth stomach and its contents, a portion of the contents of the paunch, and the whole liver were forwarded to a consulting chemist for analysis for poison. The chemist's report was negative for arsenic or any other common poison, and his finding that the cause of death was the nightshade, an appreciable amount of the poison (solanine, the toxic principle of the nightshade) being recovered from the stomach contents.

Description of Plant.

Black nightshade, or garden nightshade as it is sometimes called, is, according to Professor Hilgendorf in his book "Weeds of New Zealand," common from Auckland to as far south as Otago; and the following information, taken from H. C. Long's "Poisonous Plants on the Farm," may be of interest to farmers:

> "Black nightshade (*Solanum nigrum* L.) is a small branched annual (or biennial) of 6 in. to 2 ft. in height. It has oval leaves and lateral clusters of small white flowers, which open during the summer and autumn months. The berries are round, at first green and later black or reddish-black, resembling black currants. The whole plant is, in Britain, generally smooth, and has a disagreeable odour. It is frequently a troublesome weed in gardens, especially when these are not well cared for."

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It is stated by Bentham and Hooker that this plant is "one of the widest spread weeds over every part of the globe, except in the extreme north and south, varying so much in warmer regions as to have been described under more than forty names." It is common in England, but quite local in Scotland and Ireland.

Poison in the Plant.

Black nightshade contains the poisonous solanine chiefly in the berries, but also in the leaves and stem. The percentage of the poison present varies considerably with soil and climate, so much so that some authorities appear to have held the plant to be innocuous, while others have noted its extremely poisonous character. For example, Cornevin states that Gohier gave 3 kilos (6½ lb.) in the green state to a horse and found that it had no serious effects. Henslow states that children have been poisoned by the berries.

The United States Farmers' Bulletin No. 86 states: "The more musky coloured plants are the most poisonous. In some the amount of alkaloid in the ripe fruit and leaves is so small that these parts may be, and are, consumed in considerable quantity without ill consequences. Poisoning does sometimes follow, but it is not clear whether this is due to improper preparation or to careless selection of the parts used. The use of black nightshade for food is certainly not to be recommended." Cattle, calves, sheep, goats, pigs, ducks, and chickens have all suffered from poisoning by this plant.

Untrustworthy Plant.

Ewart remarks ("Weeds, Poison Plants, and Naturalized Aliens of Victoria," 1909) that this plant possesses no virulent poisonous properties, although it is commonly regarded as highly poisonous, partly because of confusion with deadly nightshade and partly because of hasty generalization. He adds that although a small amount of solanine is present in the stem and berries, these are usually less poisonous than green potatoes, and that the berries are often eaten by children without ill-effects beyond, perhaps, a stomach ache, or, if eaten in excess, sickness and purging, and, further, that the berries have "even been used instead of raisins for plum puddings with no results out of the ordinary."

The fact remains, however, that the plant is untrustworthy, for it seems quite clear that the berries may be edible in some seasons, countries, or localities, and poisonous in others, but any sample may be poisonous.

It is plain from the remarks of Mr. H. C. Long that climatic conditions have a bearing on the poisonous properties of this plant, so that it is quite feasible to suggest that the season just past, which has been a contributory factor in other serious trouble among stock, may have increased the poisonous properties of black nightshade.

Large Amount Consumed.

In the case of poisoning of the cattle described it must be remembered that the cattle had been travelling for two or three days before being put into the holding paddock. It can be assumed that the cattle were hungry and ate rather greedily, and that a comparatively large amount of the plant must have been consumed. In similar circumstances tutu poisoning is also recorded from time to time.

On the other hand, stock are frequently seen feeding on rape and root crops where the black nightshade is a fairly common weed without any harmful results. In these cases it must be assumed that very little, if any, of the weed is eaten because of the abundance of the other feed.

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Subterranean Clover Survey.

J. P. Beggs, Fields Division, Hastings.

(Continued from July Issue.)

IT appears that the best way of establishing subterranean clover is by sowing it in a grass-seed mixture with or without a cover crop of oats. When thus sown the stand can be "nursed" better during the first year. However, in many cases it is not convenient to sow the grass alone in this way, the practice being to lay down the grass with some crop, such as turnips or rape.

Rape is often sown rather early for the inclusion of subterranean clover, but satisfactory results have been obtained by sowing with rape in January. In fact, when sown with rape at this time results have been more satisfactory than from sowing with turnips. This has been due to less severe grazing of the rape.

Good strikes of subterranean clover are usually obtained when sown with these crops, but the grazing management is an important factor in obtaining a good stand. Provided grazing is not too severe, results are quite satisfactory. Shutting up breaks immediately they are grazed off would go a long way towards reducing damage to the clover by excessive grazing and trampling.

In some cases the seed was not covered. Frequently, however, harrows, tine or chain, followed the drill. The roller was also used for this purpose, with or without the harrows.

Faults in Sowing Technique.

The weakness in spring sowing has already been mentioned. It may be explained here that sowing at this period, especially in October and November, is very liable to result in the clover reseeding in the autumn or early winter. As stated previously, the success of subterranean clover depends largely on its obtaining a good start and developing a good root system before the cold weather sets in.

If reseeding does not take place until the autumn or early winter it means that this early start will not be obtained. The result is that the young seedlings will in all probability, be caught by the frost, and it is at this stage that the plants are especially liable to frost injury. Further, some examples were found where the seed lay dormant during the winter and did not germinate till the following spring. The liability of spring-sown stands to frost injury in the flowering stage has been mentioned earlier

Fig. 1.—Plants of the Dwalganup strain in the process of reseeding. In a number of cases this low-production strain was sown by mistake as Mount Barker (Fig. 2).

In a number of cases burying the seed too deeply appeared to be responsible for poor strikes of the clover. This was liable to occur most frequently when the seed was drilled in with oats. When the seed was broadcast there was less liability of its becoming buried too deeply.

Though cultivation was fairly good, in the majority of cases it was frequently obvious that the final stage of this operation—the consolidation of the seed-bed — had been somewhat neglected. More attention to rolling would have ensured better strikes in many instances of subterranean clover and other clovers and grasses. A firm seed-bed would also largely have prevented the seed being buried too deeply.

Sowing with Crops.

From results seen, sowing with certain crops cannot be recommended. Sowing down with wheat, for example, has been unsatisfactory, due to the times of sowing. Again, sowing with turnips has not given good results in many cases. This has been due to the subsequent treatment of the clover with this crop. The strike is usually very satisfactory, but it would appear that many stands have been checked very severely, if not totally destroyed, by subsequent grazing treatment.

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Grazing off takes place largely at the wettest period of the year (in the winter), and in many instances the paddock has been bared completely of clover and grass. From all appearances the clover had, in some cases, been entirely killed out. The practice of merely shifting the "break" fence back and giving the sheep the run of the previously grazed breaks was largely responsible for this. However, where grazing had not been too severe and breaks grazed off separately many satisfactory results were obtained by sowing down with this crop.

Subsequent Treatment of Stands.

The two major weaknesses in the subsequent treatment of stands were (1) too severe grazing and trampling through grazing off some crop such as swedes, rape, &c., and (2) lack of nursing during the first reseeding. The former factor has been dealt with above. However, it might be noted here that in a large number of cases the severe grazing was due to the fact that the crop had been sold. In such cases the purchaser naturally endeavoured to obtain a maximum return for his money.

Regarding nursing the stand during the first year, some farmers were unaware that the clover was an annual, depending on its reseeding for the following year's growth. The result was that they grazed it continuously during the period runners were being produced and seed formed. A little more care during this period—a complete spell would be best, or only very light grazing—would be well repaid by the extra cover of clover resulting the following season.

Top-dressing.

As a large proportion of the subterranean-clover areas visited were only in their first year many of the farmers had had no experience of the response of this clover to fertilizers. However, on many of the older areas fertilizers—superphosphate, in particular—had been tried, and it was apparent that a good response was obtained from the application of phosphate, providing a reasonable amount of rain was experienced in the season of application.

It would appear that a small dressing—say, 1 cwt. per acre—of superphosphate applied in the autumn of every year would be preferable to a larger dressing every second or third year. This would give the young seedlings a good start before the cold weather set in. Naturally, the benefit received would largely depend upon the occurrence of autumn rains.

Even if autumn rains were late, the superphosphate would assist greatly, in that the growth of the young plants would be speeded up, with the result that they would be further advanced by the time frosts commenced—a vital factor in obtaining the best results from subterranean clover.

The position regarding lime, however, is not so satisfactory. The number of farmers who had tried it was not very great, so that information regarding the response of subterranean clover to lime was limited. A few farmers, however, claimed that they got a definite response. On the other hand, many noticed no difference, while in a number of cases the dressing had not been on sufficiently long to judge results. It may be stated that phosphate is of chief importance. Lime may be beneficial, but this calls for further experiment, though it would be well to apply it to subterranean-clover stands in localities where a definite response to lime is obtained on ordinary pasture.

Fig. 2.—The Mount Barker strain, showing the higher leaf-production as compared with the Dwalganup in Fig. 1. The two plants were taken from the same strain trial plot.

Fig. 3.—Two plants of each of the Mount Barker, Dwalganup, and Tallarook strains taken from a strain trial plot of the Department. The Dwalganup plants are at the top left, with the Mount Barker immediately below. On the right are two plants of the Talarook strain.

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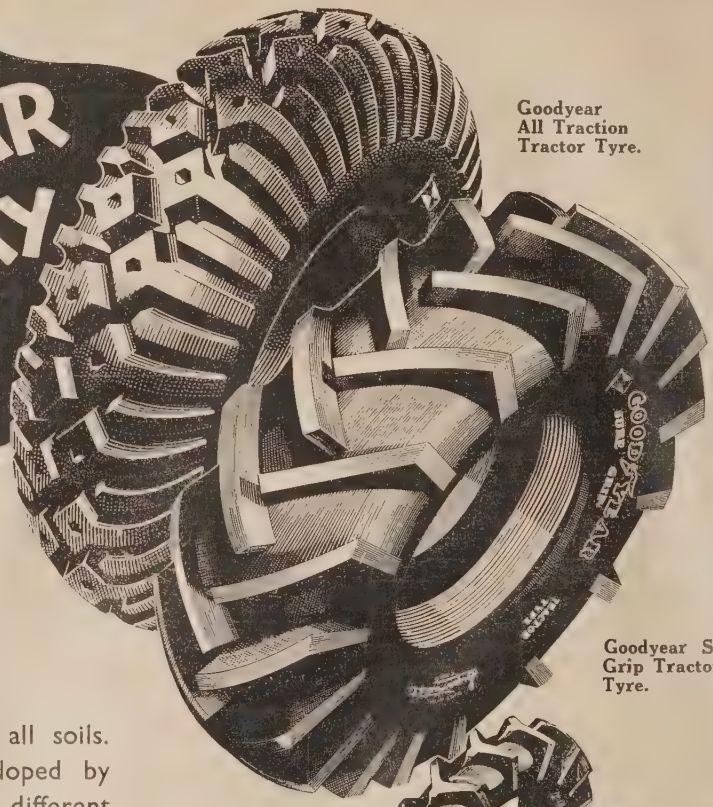

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Age of Stands.

As indicated, the widespread interest in subterranean clover has been aroused mainly during the last two or three years. As a result, the majority of the areas now in subterranean clover in the South Island are young stands. Of the stands visited in the course of the survey, approximately 70 per cent. were in their first year, 17 per cent. in their second year, and 13 per cent. were over two years old. A few areas which had been down for nine or ten years were visited, but these were rare.

These older sowings appeared to be doing quite well, though top-dressing and cultivation would probably have increased production in a number of cases. Due to the number of reseedings these areas had passed through, the subterranean clover formed a dense mat in some paddocks. It appears that some form of surface cultivation would be valuable in such cases. Tripod harrowing, followed by an application of superphosphate before the new seeds germinated with the autumn rains, should be of direct benefit, resulting in renewed vigour of the stand.

Strain in Subterranean Clover.

Until recently the Mount Barker strain has been the only one in New Zealand in marketable quantities, but now Australian catalogues list Dwalganup and Tallarook, these latter being obtainable in New Zealand. In the course of the survey the Tallarook and Dwalganup strains, together with Mount Barker and Marlborough, were seen growing in trial plots laid down by the Department of Agriculture. Of these strains, the Mount Barker and Marlborough were exactly alike in appearance. The Dwalganup was a stemmy, low-production type, but the Tallarook yielded a good leafy growth and appeared as if it might be quite a useful strain in New Zealand.

To date, practically all the subterranean-clover seed sold to farmers in New Zealand has been sold as Mount Barker, and all the farmers visited in the course of the survey had purchased their seed as such. In spite of this it became apparent that the Dwalganup strain had been sown in quite a number of cases and that the farmers concerned were all unaware that they had sown the wrong type of seed.

The Dwalganup strain is a low-production strain, entirely unsuited to most New Zealand conditions. The plants are wiry stemmed and very poor leaf producers compared with plants of the Mount Barker strain. Farmers would be wise to ascertain whether or not they have the right strain before condemning subterranean clover as a useful pasture plant on their land.

Until better strains are produced in marketable quantities it would appear that the Mount Barker strain is best suited to New Zealand conditions. Tallarook has not yet been extensively tried, but may prove quite valuable.

Failures and Partial Failures.

Complete failures with subterranean clover were encountered only in relatively few instances. Partial failures, however, in that results have not been as good as they should have been, have been more numerous. In some cases initial strikes have been poor, while others must be classed as partial failures in that establishment has been too slow. Poor strikes have been due to wrong sowing-times, lack of consolidation, and covering seed too deeply, as well as to unsuitable weather conditions in some districts. Slow establishments have been caused through wrong sowing-times in some instances, but more frequently to faulty treatment of the stands.

Sowing on the wrong soil-type might also be cited as a cause of poor results in a few instances. Subterranean clover is naturally adapted to growth on the

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lighter, freer soil-types. On heavy clays it was not so successful, the plants remaining much smaller and somewhat stunted. In some instances, where conditions were favourable for white-clover growth—a heavier soil-type and higher rainfall—the subterranean clover gradually weakened and was displaced by the white clover. In such cases it would be preferable to sow a good type of white clover, as it will yield more feed under these conditions than will the subterranean. The latter clover should be reserved for soils where white and red clovers cannot be successfully grown over a number of years.

Dry Spells.

Though the autumn of 1937 was very favourable to the establishment of subterranean clover in most parts of Canterbury, the winter, spring, and early summer were exceptionally dry, with the result that conditions for reseeding in the summer were unfavourable. This was reflected in the failure of many stands to set seed satisfactorily this year. This fact was not apparent until near the end of the survey.

On 12th November some stands were revisited in Canterbury. It was found that many plants were dying off without setting seed or when the seed was only half matured. A stand of Dwalganup, the early flowering type, was visited, and it appeared almost as bad as the Mount Barker in this respect.

The extended dry period experienced in 1937 is exceptional, however, and the reseeding of the clover would probably be affected only rarely in this way. It should be noted that in the case of established stands one such adverse season will not destroy the sward, as there will be sufficient "hard" seeds still in the ground from the previous reseeding to carry on.

Harvesting of Seed.

The production of seed of subterranean clover is only in its early stages in New Zealand as yet, but it will probably become important in the future. In the area covered by the survey only two or three farmers were visited who had harvested the seed. Small areas were harvested successfully and good seed obtained, but rain at harvest-time proved troublesome. The rain germinated the seed, and harvesting had to be abandoned.

The chain-drum stripper was the main implement used, but one farmer employed the sheep-skin roller to obtain more burrs after the stripper had been over the crop.

In one case the roughage of subterranean-clover stalks, &c., was burned off to clear the way for the stripper. The mower was also used for this purpose. Shelling was carried out with the clover-seed sheller.

(To be continued.)

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Fattening of Baconer Pigs.

Value of Roots in the Ration.

C. E. Ballinger, Ruakura Farm of Instruction.

THE Waikato bacon competition held at the Hamilton Winter Show this month was of considerable value to all who are interested in pigkeeping and the production of first-grade bacon. Two main points were clearly seen, one being that excellent bacon is produced from many breeds and crosses of pigs, and that therefore breed is of little importance compared with that of strain and type.

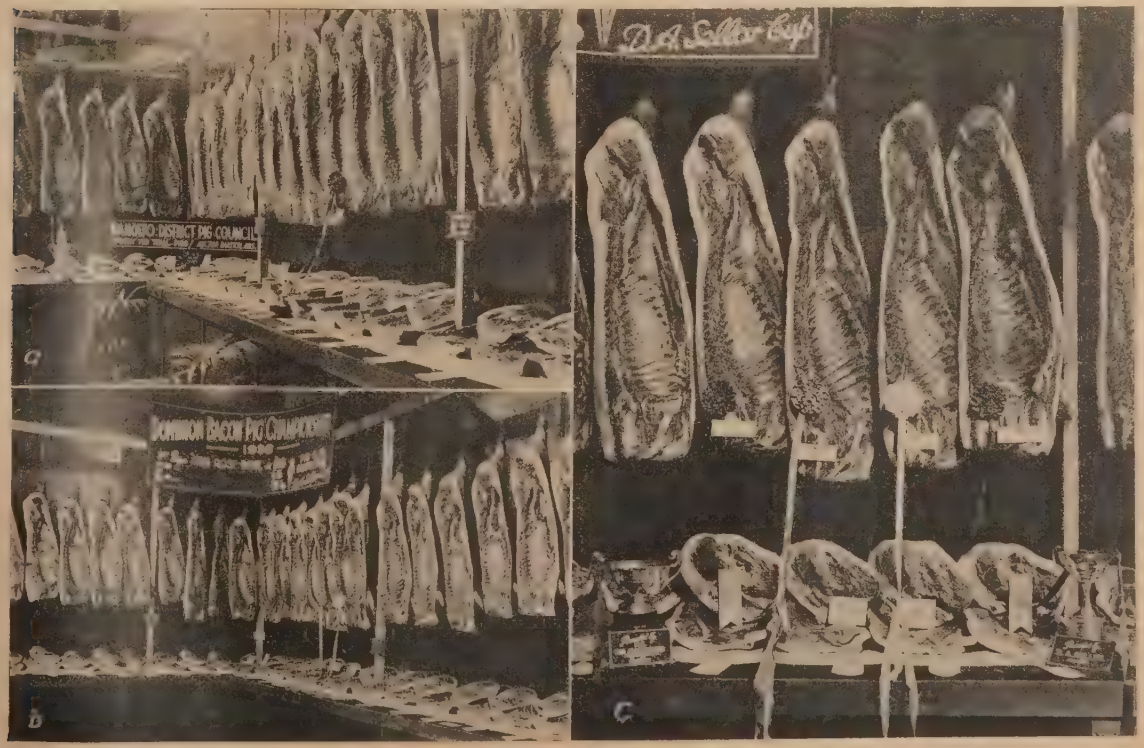
The judging, which was based on the British method, showed, however, that a greater number of the carcasses lost valuable points on length and back-fat. In general, the longer the pig the thinner the fat, and selection of a long, lean type of pig for bacon will do much to reduce excess back-fat. Much of New Zealand's bacon is produced, however, from a short porker type of pig which reaches maturity at a lighter weight than the lean baconer type. This means that deposition of what is now regarded as excess fat sets in before the pig has grown to the requisite length and weight for bacon. It is, however, the length to which the fundamental make-up of the pig allows it to grow at the desired weight.

It is thought by many that a pig maintained for a store period and fattened slowly will be a longer pig than one fattened quickly from weaning onwards, but from fattening trials carried out at Ruakura this does not appear to be the case. Pigs fattened and killed at six months of age were as long as pigs fattened slowly and killed at eight to ten months. The pigs were first-cross Tamworth-Berkshires, and were killed at the same weight in each trial. Doubtless, a pig kept long enough at a low plane of nutrition could eventually be fattened to show an increase in length, but the pig would apparently need to be kept until about twelve months of age or more. This would not be a payable proposition.

Second Point.

The second point demonstrated by the exhibit was that first-class bacon can be produced with a variety of feedstuffs, some of which are not looked upon at present as being suitable for fattening purposes.

A number of the pigs had been fattened on whey and a very small amount of meals. Many were produced with skim-milk or skim-milk and meals, such as the



(a) Carcasses in the whey-fed trials; (b) the Dominion Bacon Pig Championship; (c) a close-up of the prize-winners in the championship.

pure-bred Tamworth exhibited by Mr. Baston, of Whatawhata, which won the Dominion Bacon Pig Championship of £10 and the Sellar Rose Bowl donated by the Kiwi Bacon Co., Ltd. Finally, an entry from Ruakura, three of which were awarded a prize, were wintered and fattened on a ration consisting largely of roots.

From this it is obvious that the prize pig is not one fattened on meals in a costly and uneconomic way, but one fattened on feeds that are looked upon by many as waste by-products or unsuitable farm-produced crops.

Feeding of Whey.

While whey, if used for fattening without other feedstuffs, is not a paying proposition, yet when it is used with meals commencing with quantities of ½ lb. per day when pigs are five weeks old and increasing to 1 lb. towards the finishing stages it is capable of returning ½d. to 1d. per gallon for the whey used after deducting the cost of meals. The Waikato District Pig Council's exhibit of twelve pigs were fed whey, meat-meal, and barley-meal from weaning to bacon weight at an average cost of 16s. 3d. per pig. The cost prior to weaning was 4s. per pig, a total cost of 20s. 3d. per pig.

During the period of trial from weaning to bacon weight the average amount of food used per pig was 826 gallons of whey, 65 lb. of meat-meal, and 65 lb. of barley-meal. The weaning pig for the D. A. Sellar Pig Club Cup was one of this trial lot, a Canadian Berkshire bred by Mr. Geo. Jamieson, of Horotiu. This pig made 201 lb. live-weight on 200 days, an average daily gain of more than 1 lb. from birth to slaughter—a carcass of exceptional quality, taking fifth place in the Dominion Bacon Pig Championship.

Skim-milk and grass are capable of producing excellent carcasses, and, while a small quantity of meal may be fed with the milk to extend the use of it when supplies are short, good bacon is produced on skim-milk only.

Use of Roots.

The use of roots in the fattening ration of baconer pigs is not in practice to any extent in New Zealand, but is a common method of fattening in European countries. In Germany, for example, the Lehmann system of pig fattening has been evolved. Under this system the pig receives up to 2·2 lb. of meals a day, and the remainder of the ration is made up with various root crops, such as mangels, swedes, sugar-beet pulp, &c. In Denmark it is also a common practice to include roots as part of the fattening ration.

The reason for this is twofold—first, such root crops are farm grown and therefore cheaply produced; secondly, they are a means of reducing the back-fat of bacon pigs. Roots are bulky and useless for fattening purposes if fed alone. If fed in conjunction with a minimum of concentrates, however, they become a valuable part of the fattening ration by keeping the pig full and contented without making it excessively fat. The over-fat pigs are produced when they are "full fed" skim-milk, meals, &c., especially over the latter part of the fattening period.

It has also been found that pigs which have experienced a store period become excessively fat more easily than pigs fattened without a check from weaning. By feeding a proportion of roots in the ration the pig is "full fed," and while the rate of fattening is a little less than on skim-milk "full fed" the total quantity of food required is no greater.

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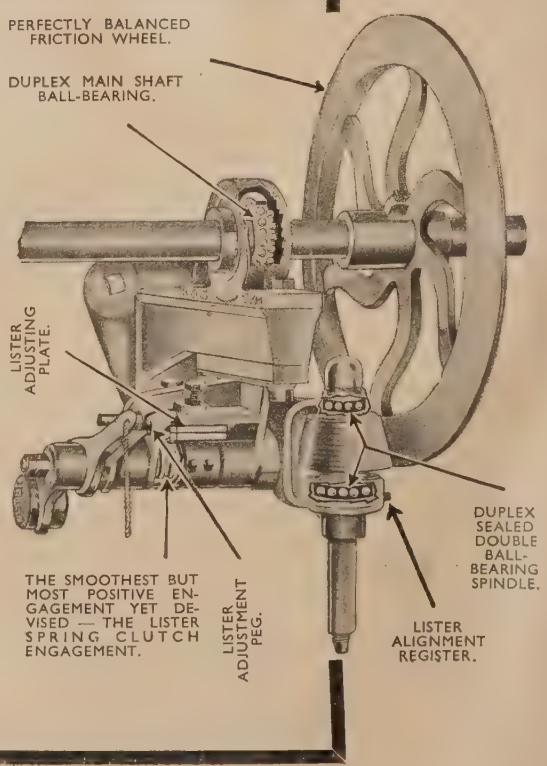
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Form of Restricted Feeding.

Root feeding is a form of restricted feeding, and it has been found that pigs on a restricted diet often require less feed to fatten than "full-fed" ones, due to increased efficiency of digestion and utilization of food. Further, there is a marked reduction in the thickness of back-fat with this method. As the chief complaint against New Zealand baconer pigs is that they are too short and too fat, restricted feeding and the use of roots in the fattening ration offer two valuable means of combating the trouble immediately.

It is of interest to give the rations on which the Ruakura prize pigs were fattened. These pigs were selected from groups that were previously on winter feeding trials. The results of these successful winter-feeding trials have already been published.

Treatment of Groups.

The treatment of the two groups from which the Ruakura pigs were selected is as follows :—

(1) *Winter Treatment (10 Pigs).*

Half a pound of meat-meal per pig per day and roots. The group was on trial for twelve weeks, and consumed ½ ton of roots per pig during that time.

Fattening Treatment.—The group was stied for fattening, and for eleven weeks received 1 lb. of meat-meal and roots. The roots were then replaced by 3½ gallons of skim-milk. The pigs thereafter received 1 lb. of meat-meal and 3½ gallons of skim-milk per day until slaughter. Throughout the fattening period the group did not receive more than the equivalent of 4½ gallons of skim-milk per pig. The average daily gain per pig was 1·04 lb. The percentage of feed as roots in the entire fattening ration was 40·7 per cent.

(2) *Winter Treatment (10 Pigs).*

One pound and a half of meat-meal per pig per day and roots. The group was on trial for twelve weeks, and consumed ½ ton of roots per pig. Their rate of growth during the winter feeding was, of course, considerably greater than that of the previous group, as the amount of meat-meal fed was trebled.

Fattening Treatment.—The group was put in paddocks for fattening, and received 2½ lb. of maize per pig per day and roots. After six weeks of this treatment the roots were replaced by 2½ gallons of skim-milk. The pigs received this ration until slaughter. The fattening ration did not exceed the equivalent of 5 gallons of skim-milk at any time during the fattening period. The daily gain for this group averaged 1·0 lb. The percentage of roots during the six weeks they were fed was equivalent to 49 per cent. and equivalent to 23 per cent. over the entire fattening period.

Excellent Baconer Pigs.

In addition to the pigs qualifying in the competition, the groups from which they were selected were excellent baconer pigs. The reduction of back-fat brought about by the use of roots in the fattening ration was one-eighth to two-eighths at the shoulder and loin compared with pigs "full fed" on buttermilk, and where pigs grade about 40 per cent. No. 1 Prime on "full-fed" rations they can be immediately improved to 80 per cent. to 100 per cent. No. 1 Prime by the use of roots as a part of the fattening ration or by restricted feeding.

The use of roots can thus be a valuable aid in pigkeeping for early spring or late autumn fattening, when skim-milk is in short supply. In addition, they are a successful means of wintering the pigs in store condition.

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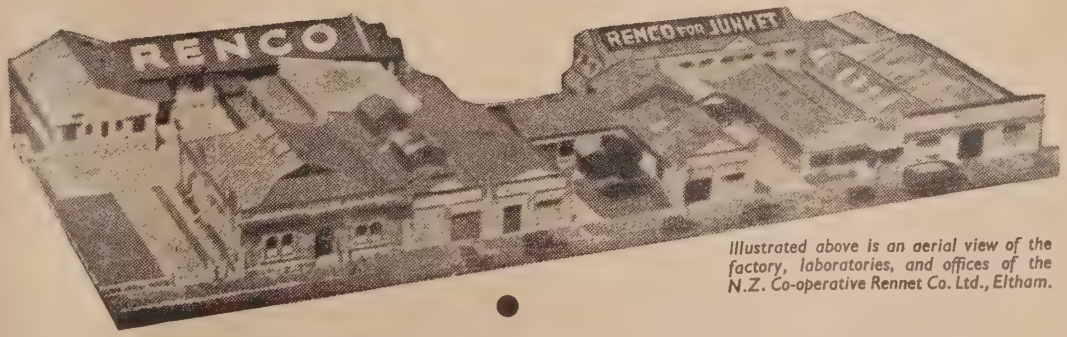

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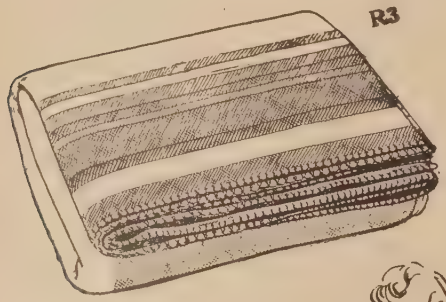

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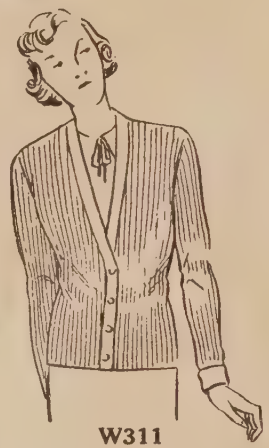

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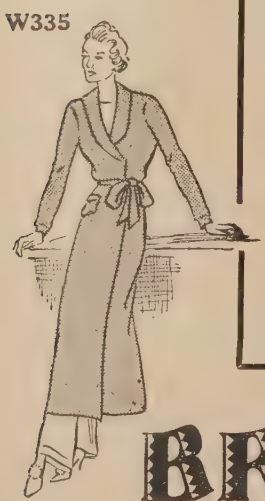

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Economic Output of Farm Labour.

R. P. Connell, Land Utilization Officer.

It is equally of importance to the nation and of moment to the individual farmer that the output of farm labour under generally parallel conditions varies tremendously.

A recent survey of dairy-farms in the Wellington Province well illustrates this. On the farms covered by the survey butterfat-production so dominated the position as to eliminate for practical purposes matters which otherwise might complicate the assessing of the labour output in pounds of butterfat. For instance, such sidelines as pig-keeping and cash-crop production scarcely entered into the farm businesses which were examined.

Output and Wages.

The annual output *per capita* of a group of sixty-five adult male workers, expressed in terms of butterfat, ranges from some 50 per cent. less than the average output of the group to some 150 per cent. more than the average of the group. Expressed another way, some of the most effective workers produced approximately 4 lb. of butterfat for every 1 lb. of butterfat produced by some of the least effective workers. The basic importance of such a wide range in the output of workers employed in the one district lies in the fact that wages, in the long-run, must bear a relationship to the total value of the workers' output.

Such a striking range in output as that noted surely points to the advisability of individual farmers studying the output per worker on their own farms and considering the possibility of an economic increase in the output of the workers on these farms. At the same time, it is worth pointing out that an increase in the output of butterfat per worker is not necessarily the most desirable objective—the increase, to be desirable, must be the most economic one. This follows partly from the fact that labour is but one of the major items in the cost of production of butterfat, other major items being (1) interest or rent, and (2) working and maintenance costs.

Associated Sidelines.

It follows partly, also, from the further fact that concentrating exclusively on the production of butterfat may not be so profitable as associating the rearing of replacement stock and the exploiting of sidelines, such as pigs, with the production of butterfat. To illustrate the point from the survey under discussion: On two farms the labour-costs were 4·9d. and 4·6d. per pound of butterfat respectively, while the total net costs on these farms were 12·8d. and 13·1d. per pound of butterfat respectively.

It is interesting to note that in the investigation just mentioned the highest output of butterfat per worker was associated with an average production which was substantially above that given by other herds in the district, together with a liberal policy of top-dressing pastures and providing considerably greater reserves of feed than are usual in the district. On the other hand, the lowest output of butterfat per worker was also associated with a liberal top-dressing policy, but in spite of that fact the herd average was substantially below that of the district, and there was no indication of any special endeavour to provide reserves of winter feed. Further, hand milking was practised.

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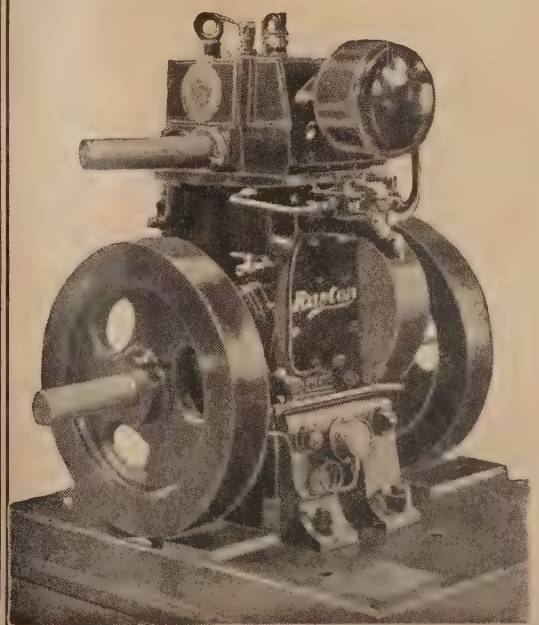

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Top-dressing Wheat with Nitrogen.

J. W. Woodcock, Crop Experimentalist, and A. V. F. Allo, Instructor in Agriculture, Fields Division.

RECOMMENDATIONS in connection with fertilizers to be applied to wheat at seeding were given in the *Journal* for April, 1938. It was indicated that an application of about 1 cwt. superphosphate was exceedingly beneficial, but that soluble nitrogenous fertilizers applied with the seed could not be recommended. It is proposed in this article to discuss the subject of nitrogen applications to wheat in spring.

Regulating Factors.

A feature of the experiments carried out with nitrogenous fertilizers on wheat is the occasional large increase—as much as 10 bushels per acre—which has been secured in experiments, indicating that under certain conditions nitrogenous fertilizers can be highly profitable. In the first few years of experimentation such large increases were frequent, while negligible increases were rare, and it was freely expected that it might be possible to issue a general recommendation to use nitrogen, just as in the case of superphosphate it is now possible to say, "Use 1 cwt. of superphosphate with the seed." Work in subsequent seasons, however, indicated clearly that no generalizations were advisable; in fact, it is difficult to particularize even after ten years' experience.

It has been indicated, however, that the effectiveness of nitrogenous fertilizers depends on several factors, chief of which are:—

Crops showing nitrogen-deficiency symptoms. The crop on the left has been treated with nitrogen top-dressing, and that on the right has received no treatment.

(1) *Previous Cropping.*—Land which has carried successive cereal crops is likely to be much lower in available nitrogen than land which has been in grass or which has carried a fodder crop fed off by stock. A cereal crop following a cereal will consequently benefit more from added nitrogen. In a series of experiments conducted between 1925 and 1933 the average increase from 1 cwt. nitrogenous fertilizer on wheat crops following a cereal crop was 4¼ bushels, as compared with an average increase of 2¾ bushels on wheat crops following such crops as grass, rape, potatoes, &c.

(2) *Weather Conditions.*—The rainfall and temperature after a crop is sown, particularly during the winter months, has a large bearing on the nitrogen content of the soil. Heavy rains leach out soluble nitrates, and, with the cold winter conditions usual in the South Island, bacterial activity is not sufficient to make good these losses. Nitrogenous fertilizers applied in the spring will, under these conditions, exert their maximum effect provided excessive dry weather does not follow. Dry weather in late spring and early summer is a serious limiting factor to responses from nitrogen top-dressing, and obviously these conditions cannot be predetermined by the farmer.

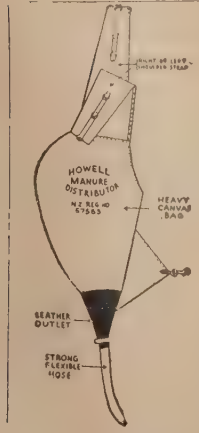
Indications of Nitrogen Deficiency.

The appearance of a wheat crop in spring is considered to be indicative of whether or not it is suffering from a deficiency of nitrogen. An adequate supply of the latter is usually reflected in spring by a dark-green coloration of the foliage and a general vigorous condition.

If wheat crops exhibit a stunted and yellowish-green appearance in the spring, provided the crop has been adequately manured with phosphate at sowing, it is safe to assume that the wheat is nitrogen-starved. A top-dressing of nitrogenous fertilizer will generally bring about a marked improvement.

Experiments in 1937–38.

During September, 1937, several wheat crops in the Christchurch district were



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observed to be exhibiting the symptoms described above, and five trials were laid down to determine the effect of sulphate of ammonia on such crops. Five plots each ¼ chain by 7 coulters were top-dressed on each area with 1 cwt. sulphate of ammonia during late September. At harvest the three centre coulters of each nitrogen plot were cut for a distance of 10 ft. and corresponding samples were obtained from adjacent "no nitrogen" plots.

The observations made on each area at time of top-dressing and at harvest were as follows:—

(1) *Trial on Farm of T. W. Brooks, Brookside* (sown after peas)—
28/9/37: The crop appeared to have a yellowish tinge and was somewhat stunted.
27/1/38: No response to top-dressing was noted.

(2) *Trial on Farm of J. F. Blakemore, Springston* (sown after wheat)—
28/9/37: The crop was not as well developed as it might be, although the colour was not particularly abnormal.
20/1/38: At harvest the top-dressed plots appeared a shade taller and thicker.

(3) *Trial on Farm of C. J. Hayson, Brookside* (sown after peas)—
28/9/37: Although a fair colour, the crop was backward and stunted in growth.
27/1/38: No response was noted at harvest. The whole crop was poor and thin owing to the weediness of the field.

(4) *Trial on Farm of D. Smith, Ashley* (sown after wheat)—
27/9/37: The crop was uneven, one-half being very yellow and the other half nearly normal. The trial was located on the former.
19/1/38: Although a response to top-dressing was noticed soon after application, dry conditions severely affected the growing crop, and no differences were noted at harvest. Dry weather during early summer ruined the crop.

(5) *Trial on Farm of Lincoln College* (sown after a poor rape crop)—
13/10/37: The crop was only 15 in. high and of a yellowish colour.
27/1/38: Top-dressed plots had more heads and taller growth. The heads were slightly larger.

Results.

The following results were obtained after threshing:—

Experiment.	Yield in Bushels per Acre.		
	No Nitrogen.	Sulphate of Ammonia.	Difference in Favour of Sulphate of Ammonia.
1. J. W. Brooks	53·6	57·0	3·4
2. J. F. Blakemore	48·2	57·4	9·2
3. C. J. Hayson	24·3	28·8	4·5
4. D. Smith ..	28·1	29·5	1·4
5. Lincoln College	32·4	43·4	11·0

Although the size of the plots harvested and the small number of replications did not favour highly significant results, the increases in experiments (2) and (5) were significant. Apart from experiment (4), in which, as has been mentioned above, the yields were low, the increases obtained from nitrogen were satisfactory, as all the trials were subject to dry weather following close on the applications.

Although sulphate of ammonia was the type of nitrogenous fertilizer applied in the above experiments, nitrate of soda is a useful alternative. From experiments carried out in previous years it has been indicated that the best time to apply sulphate of ammonia is either in August or September, while nitrate of soda is best applied from about the middle of September to the end of October.

Conclusion.

It is intended to continue with similar experiments during the coming year, provided crops can be located showing typical nitrogen-deficiency symptoms during spring. The thanks of the Department are extended to those farmers who co-operated in the wheat experiments during the past season.

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Agricultural Regulations.

The Dairy-produce Regulations 1938.

A. E. Morrison, Solicitor, Department of Agriculture.

THE Dairy-produce Regulations 1938, which are made under the Dairy Industry Act, 1908, and which came into force on 1st August, revoke all former regulations under the Act governing the production, manufacture, branding, wrapping, packing, grading, and export of dairy-produce, and re-enact the same in a consolidating set of regulations with certain amendments. In the new set an attempt has been made to rearrange the regulations so that the various matters dealt with appear in substantially the same sequence as that in which the raw product is dealt with in the industry from the point of its production to the point at which it is manufactured and exported as dairy-produce.

A summary of the amendments incorporated in the regulations arranged according to whether they affect or relate to occupiers of farm dairies, owners of manufacturing dairies, or both, is as follows:—

Occupiers of Farm Dairies.

(*a*) The end walls of milking-sheds must be concreted to a height of 4 ft. from the floor, and the interior surface of the walls so concreted must be finished smooth. This provision does not apply to existing milking-sheds until such time as they are totally or substantially rebuilt, nor to any shed which, in the opinion of an Inspector, is in a satisfactory sanitary condition.

(*b*) A permit to build is not now required from a local authority, nor is the occupier required to pay any inspection fee or other charge to a local authority in respect of the construction or alteration of a milking-shed or of any building used in connection therewith.

(*c*) A milking shed or yard must not be erected within 2 chains of a public road except with the approval of the Director of the Dairy Division of the Department, but, where approval is granted, such shed or yard may be erected notwithstanding the provisions of any by-law made by a local authority on the subject.

Pipes of Milking-machines.

(*d*) Milk-pipes of milking-machines must have a fall towards the releaser of not less than ½ in. nor more than 1½ in. in every 7 ft. for the purpose of securing proper drainage. Where the union used for connecting the separate lengths of piping is in the form of a rubber sleeve, the pipes must be supported either by two brackets fixed in position within 6 in. of the ends of each rubber sleeve or by one bracket so placed that each end of the piping is supported by the bracket. Where the union used is not in the form of a rubber sleeve and is not itself part of the bracket, a bracket to support the milk-pipe must be provided within 6 in. of either end of the union.

Electric Water-heaters.

(*e*) In order to secure uniformity in the size of electric water-heaters installed in farm dairies to provide the hot water necessary to clean the milking-machine and appurtenances, the capacity of the water-container and the rating of the heating element appropriate to the size of the milking plant installed are specifically set out. This provision does not apply to electric water-heaters already installed unless, in the opinion of an Inspector, they are inadequate for their purpose.

(*f*) Notification of intention to install a water-heater other than an electric water-heater, whether previously used or not, must be given to the local officer of the Dairy Division for the district in order to bring that appliance into line with other appliances concerning which notification of installation must be given.

(*g*) A milking-machine must not be installed in a milking-shed which does not comply with the requirements of the regulations, nor shall any appliance be installed in a supplying dairy in a position where it is likely to contaminate milk or cream or in a position which, in the opinion of the Director of the Dairy Division, would be unsatisfactory.

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Owners of Manufacturing Dairies.

(*a*) In the grading of milk two additional tests are authorized to be used—the senses test and the sediment test. The senses test is the examination of a sample of milk by the milk-grader's sense of sight, taste, and smell; while the sediment test is the obtaining and examination of a sample of milk for sediment as commonly applied in the dairy industry. Where two tests are required to be used for grading milk, the grade to be assigned shall be that grade which, by the application of either test, is ascertained to be the lower. In the grading of milk for butter-manufacture the microscopic test must now be used in conjunction with the senses test, and the reductase test must also be used in conjunction with the senses test, but the last-mentioned test must be carried out in manner prescribed by clause (11) A, Regulation 16. This clause provides that in the application of the reductase test combined with the senses test the samples which, after the prescribed period for the reduction of the colour, have not decoloured must be poured into a clean vessel and there graded by the senses test. The grade of milk may be based solely on the senses test or on the sediment test where the milk is, in the opinion of the milk-grader, second grade, thus rendering it unnecessary to carry out any other prescribed test in such cases. Where milk is delivered by a morning and an afternoon delivery, the sample to be taken for grading shall be a representative sample made by mixing a sample taken from the afternoon delivery, held overnight at a temperature of not less than 65° F. nor more than 70° F., with a proportionate sample taken from the milk delivered by the same supplier on the following morning.

Miscellaneous Provisions.

(*b*) The same room must not be used for the manufacture of butter and casein in the manufacturing dairy registered as both a creamery and a casein-factory.

(*c*) Tanks for holding water for the purpose of washing butter must be covered to prevent the entry of dust, birds, animals, and other foreign matter.

(*d*) A strainer consisting of woven wire gauze or a perforated plate must be provided between the outlet from the cream-holding vat and the churn. The woven wire gauze or perforated plate must be made of staybrite steel.

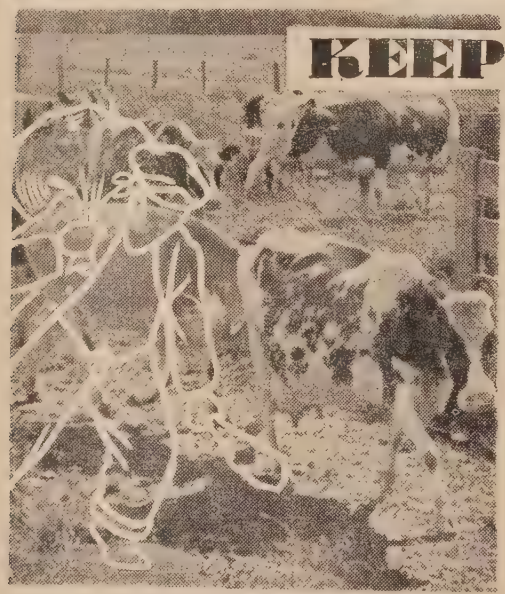
(*e*) A person's bare hands must not be brought into contact with butter immediately following manufacture or during the wrapping, packing, or transport of it.

(*f*) Sugar, boracic acid, borax, or boron compounds must not be added to butter during manufacture.

(*g*) The salt content of butter intended for export as salted butter must not be less than 1 per cent. nor more than 2 per cent. by weight if manufactured during the months from July to November, both months inclusive, in any year, or less than 1·25 per cent. nor more than 2 per cent. if manufactured during any other month in any year.

(*h*) Butter must at all times while deposited in a manufacturing dairy be adequately protected from the sun. Butter and cheese for delivery to a grading-store must at all times during transit be similarly protected from the sun.

(*j*) Butter in the form of pats must bear on the wrapper a mark in figures made with a perforating instrument indicating the number of the churning, the day of the month, the month, and year of manufacture.



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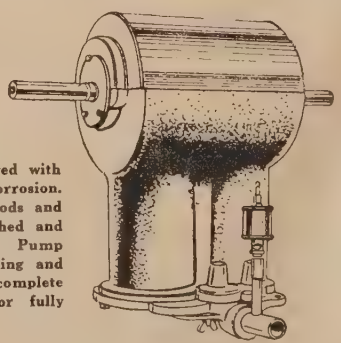

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(*k*) With regard to the branding of cheese-crates, the prescribed marks, such as "white," "coloured," "waxed," "vat marks," must be placed on the ends of each crate in the respective positions laid down in the regulations.

Butter-boxes.

(*l*) The only standard export box for butter now allowed is the former sub-standard metal-bound box. The former standard box and the saranac box are eliminated. In order to permit existing stocks of saranac butter-boxes to be used, authority to pack butter in this type of box is extended to 31st October next. The specifications for the standard box have been varied in respect of the quality of the timber to be used, the method of nailing, the use of three-piece boards, and generally for the purpose of improving this type of box.

Grading-stores.

(*m*) The temperature and the humidity of grading-stores in which cheese is stored must be observed and recorded twice daily.

(*n*) Technical officers of the Primary Products Marketing Department, duly authorized by the Director of the Dairy Division, shall have the right of entry into grading-stores for the purpose of inspecting and examining dairy-produce deposited therein and the building, plant, and equipment thereof.

Grading Fees.

(*o*) Where butter or cheese is not packed in the prescribed box or crate—*e.g.*, in a vacuum pack—the number of boxes of butter or crates of cheese on which grading fees are payable shall be ascertained by dividing the net weight of the butter or cheese so packed by a weight of 56 lb. in the case of butter and 162 lb. in the case of cheese.

(*p*) Where butter or cheese is graded for local consumption the grading fee shall be computed on the basis of thirty-six boxes of butter or five crates of cheese in respect of each sample submitted for grading and actually graded.

(*q*) In order to secure uniformity in arriving at the weight of cheese for the purposes of the monthly return to be furnished to the Department of butter and cheese manufactured, the weight of all cheese shall be the actual weight as ascertained by the owner of the manufacturing dairy on the 22nd day or the 15th day following the date of manufacture, according to whether the cheese was manufactured during August and September or during any other month in any year.

Farm Dairies and Manufacturing Dairies.

(*a*) Milk or cream must at all times be protected against the entry of any foreign matter.

(*b*) In order to ensure that suppliers are credited with the correct weight of all cream supplied, the tare weight of cream-cans must now be checked by owners of manufacturing dairies every year between 1st May and 31st July or when a can is first used in the next season and whenever there is a noticeable defect in the can likely to affect its weight.

(*c*) The restrictions on the transfer of supply of milk or cream during any manufacturing season have been extended to apply to the supply of milk or cream to all manufacturing dairies except those registered as private dairies, tinning-houses, or packing-houses.

Rejection of Milk or Cream.

(*d*) The revoked regulations provided that milk or cream affected by putrefactive decomposition or containing any animal, bird, or maggot should not be utilized in the manufacture of a product for human consumption, and to secure this end the milk or cream was required to be treated with methyl violet so as to colour effectively the whole of it. This provision has now been extended to include milk or cream which, in the opinion of the owner or manager of a manufacturing dairy, is detrimentally affected with the flavour of any disinfectant, kerosene, or any strong-smelling substance, or which contains any foreign substance, material, or thing rendering it, in the opinion of the owner or manager, unfit for the manufacture of a product for human consumption. The owner or manager of a manufacturing dairy is also empowered to refuse to accept delivery of any milk or cream, which, if manufactured separately, would make butter or cheese that would, in the opinion of the owner or manager, be graded lower than second grade. Methyl violet may, in the discretion of the owner or manager, be added to any such milk or cream. The owner or manager may also refuse to accept delivery of any milk or cream which, if mixed with other milk or cream accepted by the owner or manager, would make a product to which, in the opinion of the owner or manager, would be assigned a grade lower than the grade that would have been assigned to the manufactured product but for such admixture. He may also refuse to accept delivery of any milk or cream the supply or delivery of which would constitute a breach of a lawful order given by an Inspector under the Act.

Payment for Milk.

(*e*) Payment for milk supplied for the manufacture of butter shall be at least ½d. per pound of butterfat less for milk graded as second grade than the rate for that graded as first grade instead of at least 1d. per pound of butterfat less as heretofore.

Copies of the regulations, with special index, may be obtained from the Government Printer, Wellington, price 2s. 6d., plus postage 1d., remittance with order.

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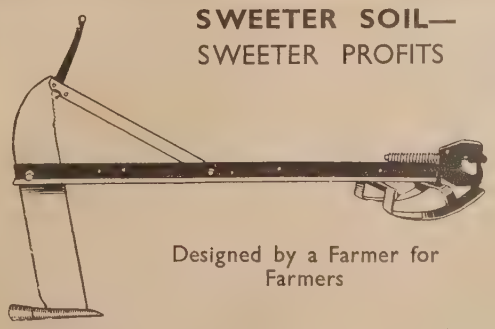

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The Bobby Calf Marketing Regulations 1938.

THE Bobby Calf Marketing Regulations 1938, enacted under the authority of the Primary Products Marketing Act, 1936, and the Agriculture (Emergency Powers) Act, 1934, give statutory protection to a scheme for the formation by producers of voluntary pools in defined areas for the marketing of bobby calves raised or produced in those areas.

The regulations accordingly provide that, upon being satisfied by documentary evidence that a majority of producers in any area of land are desirous that such area should be declared a pool area for the marketing of bobby calves, the Minister of Marketing may, by notice published in the *Gazette*, define and declare that area of land to be a Bobby Calf Marketing Pool Area under a name to be set out in the notice. Any pool area so defined may by a like notice be altered or extended or otherwise varied or declared to be no longer a pool area.

For every pool area so defined and declared there shall be a Bobby Calf Pool Committee, to be appointed by the Minister after consultation with the producers in the pool area for which the committee is established. Members of a committee hold office for a term of one year from the time when their appointment takes effect, and thereafter until a substituted appointment is made and takes effect.

The functions of a committee shall be to regulate in such manner as it thinks fit the marketing of all bobby calves raised or produced within its pool area. In carrying out its functions a committee may appoint and discharge sub-committees, and may delegate to a sub-committee any of the powers and functions of the committee.

The powers of a committee shall not be affected by any vacancy in the membership of the committee, and the committee may regulate its own procedure for the conduct of its business and the exercise of its functions. In the exercise of its powers and functions a committee shall be deemed to be the agent of the producers for the marketing of bobby calves raised or produced within its area, and the relationship thus existing between a committee and the producers shall be governed by the law of agency.

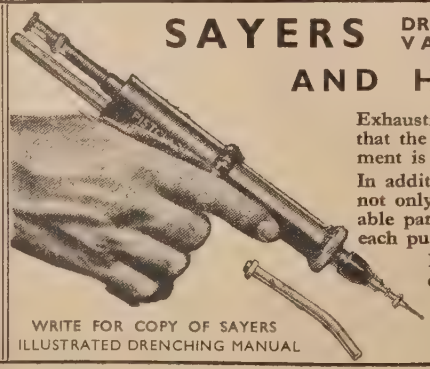
The regulations prohibit any producer carrying on business within a pool area from selling and any other person from buying any bobby calves raised or produced within the pool area except through the agency of the committee established for that area. Every person who sells or purchases any bobby calf in breach of the regulations is guilty of an offence against the regulations, the penalty for which is a fine of £1,000 in the case of a company and £200 in the case of an individual.

The Agricultural Workers Extension Order (No. 3).

THE Agricultural Workers Extension Order (No. 3) 1938 extends the provision of Part III of the Agricultural Workers Act, 1936, with the necessary modifications and with the further modifications set out in the Order, to agricultural workers employed in market gardens (including market gardens where soft fruit is produced) situated in the Canterbury Industrial District. The Order came into force on the 27th June, 1938, and will continue in operation until the 23rd April, 1939, and thereafter until a further Order is made.

The Order contains substantially the same terms as the Agricultural Workers Extension Order (No. 2) 1938, relating to workers employed in market gardens situated in the Wellington and Nelson Industrial Districts, a summary of which appeared in the June issue of the *Journal of Agriculture* on page 442.

Attention is drawn, however, to a variation in the rates of wages provision. The Wellington-Nelson Industrial District Order provides that a male adult worker who, at the date of coming into force of that Order, was in receipt of a wage exceeding £4 per week, should on and from that date receive an increase of not less than 2s. 6d. per week on his then present wage, whereas the Order under notice merely provides that an adult male worker who, on the date of coming into force of the Order, receives wages in excess of £4 per week shall not have his wages reduced.



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Salmonella Suipestifer Infection of Pigs.

D. Marshall, M.R.C.V.S., Veterinarian, Hamilton.

THIS is probably the commonest infection of pigs in New Zealand to-day, and is certainly responsible for more unthriftiness and mortality amongst younger pigs than any other single complaint.

Whilst largely a dirt disease, occurring periodically and causing greater mortality where pigs are kept in dirty runs and under insanitary conditions, it may also appear occasionally where the general lay-out appears satisfactory. In such cases there is nevertheless some factor leading to lessened resistance.

Pigs kept under good conditions.

Cause.

As with numerous other diseases of animals and man, we have (*a*) a bacterial factor the *Salmonella suipestifer*, and (*b*) defects of hygiene and nutrition which reduce the animal's vitality and allow rapid multiplication of the germ in the tissues until it produces disease. In *suipestifer* disease these predisposing causes are highly important. The *suipestifer* germ is, however, accepted by authorities as the bacterial cause. It was at one time believed to be the cause of swine-fever, since, by feeding cultures of the germ to pigs, disease was produced with certain lesions in the intestine which at that time were thought to be typical of swine-fever. Later work showed swine-fever to be due to a virus invisible through the microscope and that *suipestifer* organisms were in many cases also present and responsible for the gut lesions.

S. suipestifer is found in large numbers in the lungs, liver, and other organs of pigs sick or dying in the more acute stage of this disease, and is probably freely distributed by such pigs before death through the nasal discharges and dung. The sick pig is therefore the chief cause of spread. Carriers occur, however, probably animals which have recovered quickly from a mild attack.

An insanitary pig-run.

In the United States of America Van Es states that the organism was recovered from about 8 per cent. of apparently healthy pigs.

In New Zealand during a departmental investigation of pleurisy in pigs *S. suipestifer* was found in a small percentage of the samples of lung sent in from pigs found at freezing-works showing lesions of pleurisy.

The runs may be contaminated by the discharges and remain ineffective for at least some weeks, unless exposed to bright sunshine.

It may be remarked here that in a small percentage of cases diagnosed during life or at post-mortem *suipestifer* infection have shown on laboratory examination a streptococcus as the organism present. The significance of this is not at present known.

Animals Affected.

Suipestifer infection is essentially a disease of the young pig, and greatest loss

usually occurs at the stage from weaning up to about fourteen weeks old. However, suckers may be infected, and where there is a serious mortality, usually preceded by scouring, in small piglets this may be suspected. Such cases are more likely to occur where sows farrow in old and dirty sties, or where they and the young have access to filthy wallows, or where through indifferent health of the mother or poor milk-production the little ones are poorly nourished. Outbreaks occur occasionally in pigs approaching bacon-weight, but the disease is infrequent in those over six months old, thus differing from swine-fever, in which disease pigs of all ages are equally liable to attack.

Symptoms.

In suckers, as stated, scouring is frequently in evidence, with unthriftiness and numerous deaths.

In weaner pigs and porkers the disease may be met in three forms, or at least is most conveniently described under three headings.

In the acute (septicæmic) form the pig dies after a very short period of observed illness, or from twenty-four to forty-eight hours, during which it is feverish, refuses food, and may show some discoloration of skin. Such cases may appear at the start of an outbreak. In my experience they have been more frequent in pigs of about 120 lb. live-weight, previously doing well, and very often getting unlimited amounts of skim-milk. Post-mortem examination frequently shows little beyond a general congested state of organs, with a swollen, dark, almost black liver, and occasionally dark "burnt" areas on stomach-lining.

More often, however, signs of lung involvement develop; the pig may continue to take a little food, breathing is hurried, there is a jerk of flanks with each expiration, condition is lost rapidly, and pig becomes flat-sided. There is some discharge from nose. Death may occur at any time, though some cases linger on for ten to fourteen days. Shortly before death discoloration of the skin is usually marked, the ears, belly, and inside of thighs becoming red or purple. A post-mortem examination of such cases will show varying degrees of consolidation of the lungs (pneumonia), with the smaller air-tubes filled with milky pus, gastritis with dark-red, almost black, patches on lining of stomach is often present, and small ulcers or pits on lining of large bowel may be present.

During an outbreak many pigs may go off their feed for a day or two and then apparently recover, without any more definite signs of disease. It is quite probable that a number of the cases of recovered pleurisy found in the slaughter-house are the result of such mild attacks.

The third type, somewhat more chronic in nature, is frequently described as necrotic enteritis, the large intestine being the part mainly affected. Scouring is in evidence, pig becomes gaunt and miserable, but may continue to feed. Examination after death shows large intestine thickened and ulcerated, or covered with whitish membranes. Peritonitis is often present.

While in this form also numerous mildly affected pigs probably recover without having shown marked symptoms, the result once the chronic stage is reached is always unsatisfactory and the pig either dies or is killed as a hopeless case.

American veterinarians consider necrotic enteritis to be the most common type of the disease, but Waikato experience suggests that here at least it is much less common than the chest type.

General Principles of Control.

S. suipestifer organisms have not the virulence and rapidity of spread of such a disease as swine-fever, happily at present absent from New Zealand. Before the *suipestifer* germ can cause disease the resistance of the pig must in some way be lessened. The first thing to do where the disease is recognized is to carefully review all aspects of the accommodation, feeding, and management to discover any defect. Some such aspects may be discussed. *Housing* should be warm in winter, cool in summer, well ventilated, but free from draughts. Wooden flooring is essential, partly to avoid damp, but also to prevent excessive dust, which induces coughing and predisposes to lung infections.

Overcrowding in houses and runs and at troughs should be avoided. Runs and feeding-places should be clean and free from filthy wallows, especially those formed by drainage from sties and cow-sheds. Where runs are old and dirty, if the organism is present dirt protects it and allows it to be carried on the pigs' feet into troughs, and swallowed by other pigs. In such cases the only solution may be a new lay-out on fresh ground.

Deficiencies in Feeding.

Defects and deficiencies in *feeding* are highly important. Experiments carried out by Dr. Hopkirk at Wallaceville indicated that deficiency of vitamin A lessened resistance to *S. suipestifer* infection. This vitamin is present in such substances as good-quality cod-liver oil, the butterfat of whole milk (more so in summer than in winter, and practically absent from separated milk), in green stuffs, and to some degree in meat-meal.

It has been said that the disease is most in evidence in weeks following weaning. Unless proper care is taken many pigs receive a check at this stage and are susceptible to any bacterial infection that may be present. The use of the creep method to avoid such checks, small allowance of cod-liver oil for a week or two to ensure a supply of vitamin A, and a proper allowance of suitable meal food along with the skim-milk, or whey ration, will greatly increase resistance to disease at this period.

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The disease is more in evidence in weaners from the early spring litters than in the summer-farrowed pigs. Probable reasons for this are that in the spring runs are wet and muddy, weather is very changeable, and the vitamin A supply to the suckers in the early farrowing sow is less. Cod-liver oil is therefore most important to the spring weaners and would be beneficial to the sow if fed before farrowing. In the cold, northern countries it is routine practice to feed cod-liver oil to pigs during the winter.

Value of Grass.

The value of grass is frequently seen. If at the commencement of an outbreak pigs in sties or bare runs are turned out on to a good leafy cow pasture the trouble often stops. Some of the benefit is due to increased exercise and some to cleaner conditions, but most to the variety of fresh feed. Absence of vitamin A may be a factor where pigs are in very dry, bare runs and on skim-milk alone.

It is sometimes difficult to see the explanation for the occurrence of a number of comparatively sudden deaths from the acute (septicæmic) type of *suipestifer* infection in well-grown pigs around 100 lb. live-weight. Usually the evidence is that pigs have been doing particularly well and housing and hygienic conditions generally are satisfactory. Such cases are more frequent about November than at other periods—a time when there is abundance of skim-milk and one finds that pigs have been receiving unlimited skim-milk and nothing else. In such cases it is advisable to give 1½ oz. to 2 oz. Epsom salts or Glauber salts per pig in the milk. Repeat at least twice at intervals of one or two days, cut down milk considerably and, if possible, allow access to good grazing. The pig is an omnivorous feeder and will always be healthier with a variety of feeds than on large quantities of milk alone.

Another source of outbreaks is the sale pig. Too often it is the unfair practice where deaths have occurred to clean out the balance of pigs to the nearest sale. The result often is that an unsuspecting purchaser takes them home to find that deaths continue and the disease spreads to his own pigs. The Department has more than once been asked to take steps to prevent the practice. The difficulties attending such control would be great, however. The ideal is to breed one's own requirements, but as this is not always possible the intending purchaser should be aware of the risk. He should either buy from a reputable vendor, or at least avoid any suspicious line, uneven in size or condition, or showing mattery eyes, and, finally, should keep such pigs apart from his own for ten to fourteen days or until satisfied they are all right. No newly purchased pigs should be full fed for two or three days until they are accustomed to any passible change in type of food.

Control of an Outbreak.

It will be realized that there is no specific treatment for this disease. Attention should be mainly focused on preventive measures and on increasing resistance of those still apparently healthy. Certain things may be done, however.

In *suckers*, scouring may be due to several causes, and *suipestifer* is probably only one of a number of bacterial factors playing a part. It may be suspected, as already stated, where farrowing-pens are dirty and old or where either the mother or the young have access to filth. Little benefit will result till these conditions are remedied. Anæmia is a possible factor, and though scouring is not a symptom of anæmia in the piglet iron is of undoubted value in many cases. Parrishes food, or a solution of ½ oz. sulphate of iron to a pint of water (if necessary adding molasses to make it sticky) or syrup of phosphate of iron, may be used, either smeared several times a day on sow's teats, or in small doses to piglets. Fishwick (*Journal of Ministry of Agriculture*, Sept.–Oct., 1937) has recently published excellent results in prevention of scour by the use of barley-water iron. Barley water is made by stirring 1 lb. barley-meal thoroughly in 1 gallon boiling water. This is allowed to cool and settle. The cloudy liquid (barley water) is poured off, and to it Parrishes food is added at rate of 1 oz. per pint. This is then offered to little pigs in the creep from two weeks old. The mixture must be prepared fresh daily.

Another step in the control of scour of all young animals is temporary reduction of milk-supply, and this is best accomplished in the pig by cutting down sow's feed for two or three days and giving her a dose of 3 oz. salts in feed.

Where outbreak occurs in older pigs any apparently sick animals should be separated from the healthy and given light laxative diet and comfortable quarters. Chronic cases, unthrifty and obviously hopeless, should be destroyed to limit amount of infection.

Cod-liver oil should be fed to all pigs for a period at from teaspoonful to dessertspoonful daily, depending on size. Where lung symptoms are mainly in evidence attend to housing and bedding, spray inside walls of houses with a volatile antiseptic such as creasote. Iodine, a few drops per pig daily in the milk, appears to be beneficial. If intestinal type predominates, troughs should be limed frequently, and chloride of lime or other chlorine preparation used in the milk, 1 or 2 teaspoonsful per 40 gallons.

Cleanliness Imperative.

It cannot be too often repeated that if runs, &c., are old, dirty, and contaminated little improvement will follow till this is remedied.

Where cases occur in reasonably clean, new runs, what steps can be taken to purify them ?

According to Van Es the germs are resistant to drying and may remain alive in dry soil for months. Direct exposure to sunlight will kill them in a short time. Therefore, if the surface of run is but little broken, closing up for three weeks in bright weather may be sufficient. If run is badly poached up, harrowing or possibly ploughing and regrassing would be desirable. Chemical disinfection of soil is not practicable, but lime is always helpful on pig-runs, and a good heavy dressing, preferably of burnt lime, is known to have a good effect on certain infections. Holes and wallows should be filled up and troughs well scraped and cleaned, then stood up in sun.

Experiments with a vaccine are in progress, but at present this cannot be offered as a practical control measure.

Since the tendency in New Zealand is to look abroad for wisdom it may be worth concluding with some remarks of an American veterinarian dealing with swine disease (Dr. Aitken, Iowa, *Veterinary Medicine*, January, 1938) : " When finally convinced that preventable infectious conditions do exist we next must sell the swine raiser on the value of such an unspectacular remedy as sanitation. We must overcome the influence of his predecessors who recognized no such infections as plague and who were able to raise swine successfully in perhaps the very quarters in which the swine raiser of to-day is having trouble . . . If the money spent for medication were applied wisely for sanitary measures our swine diseases would be greatly reduced."

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Advantages of Straw Sheds.

Uses and Methods of Construction.

S. H. Saxby, Instructor in Agriculture, Dunedin.

FARM shelter is usually associated with shelter-belts of trees or living hedges and fences. The value of these cannot be gainsaid, as they afford valuable protection for both stock and crop. It should be remembered, however, that they are essentially break-winds, and seldom provide a complete protection from wind or rain. For this reason additional shelter, such as stables and implement-sheds, is provided on most farms. Because of the cost, the number of wooden and iron sheds that can be built on the farm is very limited, and if additional shelter is to be provided some other method must be found.

Most farmers appreciate the value of a few straw-stacks around the farm, particularly where trees are absent. The stacks provide a certain amount of shelter and rough feed, but the shelter they afford is not very great. On the other hand, a well-built straw shed is both inexpensive and very useful.

Numerous Uses.

The uses to which it may be put are numerous. First, it should be realized that it is wind- and water-proof and, because of its thickness, is very much warmer than most iron and wooden buildings. It is excellent as a shed for storing and sorting potatoes, both for the potatoes and the operators, as it is practically frost-proof, and it may also be used as a store-shed for implements, grain, seed, manure, and chaff.

Fig. 1.—A large straw shed, used chiefly for the housing and feeding of horses. This is more than five years old and was retopped for the first time last year.

Its chief use, however, is as a shelter for stock. Those in the steading may be used for the feeding and wintering of stock. Early calving cows may be warmly accommodated in a straw shed, and smaller and less pretentious sheds could be erected along fence-lines with straw and hurdles for the use of sheep during the winter and at lambing-time.

The accompanying photographs illustrate two types of sheds which can be erected, according to circumstances. These are some of the five of these straw sheds on the farm of Mr. J. Young, of Allanton, where these photographs were taken.

Method of Construction.

Figure 1 illustrates a shed with internal measurements of 48 ft. by 18 ft. by 9 ft. The method of construction is as follows :—

Three rows of 12 ft. posts are sunk 3 ft. into the ground—15 ft. or so should be allowed between posts if the shed is to be used for the housing of implements. This constitutes the frame of the shed. Sheep-netting is then run around the frame up to the tops of the posts, and railway irons or strong timbers are laid along the length of the three rows of posts and spiked in order to make them secure. Across these again are laid pieces of lighter timber—tree-branches are quite suitable—at a spacing sufficiently close to prevent the straw dropping through. Wider spacing may be adopted if a further light covering of scrub or light branches is overlaid.

Before covering the frame with straw it is advisable to place a quantity of gorse outside the netting. This acts as a sure deterrent to the pulling out of the straw by animals. The straw may be placed over the frame by hand, but in

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the case of a large shed it will be found well worth while to build the straw cover straight from the elevators of the threshing-mill, which can be placed in the required position without much difficulty.

Height of Roof.

The base of the sides and the back of the shed should have a covering of about 6 ft., which should taper slightly to the tops of the posts. When the walls are about half built a board should be laid along the straw and tied back to the posts. This will ensure that the straw will not fall away from the walls. The height of roof required depends on the depth of the shed, but it should be built sufficiently high to ensure a good enough pitch to run off as much water as possible. For a large shed, building can proceed until the straw cannot be lifted any higher by the elevator.

The straw top is then tied down with netting and weighted wires, the netting being used to prevent the wires from cutting into the straw. This should be done securely, as the top is expected to last for several years, and if it is not well tied down both wind and rain may cause considerable damage.

For drainage it is advisable to cover the floor with about 1 ft. of soil, clay, or shingle. Additional drainage may be secured by sloping the floor slightly.

The whole shed, of course, should be built with the back to the south wind or to the prevailing wind, and on a slight rise if this is possible.

Selection of Straw.

Straw of wheat or barley is more suitable than oat straw, which is not only more valuable as fodder but is also of poorer lasting quality. This method of covering with straw is more satisfactory when threshing from the stook, but if stacks are previously built in a suitable position threshing from the stack is also quite satisfactory.

Fig. 2.—The interior of a small shed with walls made of baled straw and spanned with two old telegraph poles.

Fig. 3.—A large shed used for the storage of implements and the housing of ailing stock. Note the railway-iron spans.

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Figure 2 illustrates a smaller type of shed, which uses much less timber. The walls in this case are made of a double layer of straw bales. The only timber needed is two strong poles—old telephone poles are suitable—and the cross timbering of branches. This shed is 18 ft. long, 12 ft. deep, and 9 ft. high (internal measurements).

Baled straw has, however, certain disadvantages. First, it is suitable only for sheep, and even then it is necessary to line it with netting. Cattle and horses are very liable to push the walls down unless they are well stayed with posts and timber. Secondly, no matter how carefully the bales have been placed, they are certain to settle considerably and not necessarily evenly. This type of shed, however, is quite useful for sheep or for storing grain, seed, chaff, or implements.

The life of these sheds is indefinite, provided they are well built. Every five years or so the saturated portion of the top may be removed and replaced by fresh straw.

Summarized, the advantages of straw sheds are as follows: (1) Cheapness to erect; (2) permanency if well constructed; (3) greater warmth as compared with corrugated iron; (4) wind-proof and water-proof; (5) useful for protection of both live and dead stock.

Development of Viticulture.

Climate Compares Favourably with Wine-producing Countries.

J. C. Woodfin, Vine and Wine Instructor, Te Kauwhata.

THE earliest records we have of the culture of grapes in New Zealand date from 1818, when vines were introduced from Australia by Samuel Marsden. In 1835 they were mentioned by Charles Darwin as growing at Waimate, and in 1838 Pollock stated that grapes were largely cultivated northward of the River Thames. In the South Island the French immigrants planted vineyards at Akaroa in 1840.

In 1875 the Marist Bros. planted a small vineyard at Meeanee, near Napier, for the purpose of making wine for sacramental and table use. Later they moved to Greenmeadows, where they have now a larger vineyard and make several types of wine, including an excellent dry wine of the Burgundy type. In the "eighties" and "nineties," following the example of the Marist Bros., some of the leading settlers in the Hawke's Bay, Gisborne, Tauranga, and Masterton districts planted small vineyards, varying from 2 acres to 20 acres, mostly with the intention of making wine.

Fig. 1.—A vine varietal trial ground at the Te Kauwhata Horticultural Station.

Expert's Report.

In 1895 the New Zealand Government asked the Victorian Government to allow their viticultural expert, Signor Romeo Bragato, a graduate of the Viticultural College of Conegliano, Venizia, to come to New Zealand and make a report on the possibilities of viticulture and wine-making. The request was acceded to, and Signor Bragato furnished a decidedly favourable report, in which he mentions Central Otago, Akaroa, Nelson, Motueka, Masterton, Hawke's Bay, Tauranga, the environs of Auckland, and Whangarei as being particularly well suited for viticulture. He found grapes growing to perfection in all these districts, and in Central Otago the grapes were found to be ripe on the 25th February and more mature than he found them later at Masterton, in the North Island.

Comparison with European Countries.

Signor Bragato was appointed Viticulturist and Oenologist to the New Zealand Government in 1902, and four years later he wrote a treatise on "Viticulture in New Zealand." In summing up the question of suitability of the country for viticulture and winemaking he made the following statement:—

"At the risk of wearying the reader with details and decimal points I have given full comparisons, both as regards temperature and rainfall, between the climate of New Zealand and that of the wine-producing countries of Europe. I have also compared minutely the wines produced here with the most famous wines of Italy. This has been done to meet the frequently urged objection that the climate of New Zealand is unfavourable to the production of good wine, and to convince hesitating planters that the North Island of this country is endowed with a climate well suited to the production of high-class light wines."

A more recent authoritative opinion comes from Dr. E. Kidson, M.A., D.Sc., Director of Meteorological Services, who stated on page 30 of the New Zealand Year-Book, 1931: "As regards the nature

of things grown . . . Grapes, for instance, can be grown successfully out of doors in parts of all provinces of the Dominion,"

Viticulture has been carried on for more than a hundred years in New Zealand, and it has been proved beyond a doubt by the New Zealand Government and private individuals that both table grapes and wine grapes can be grown under suitable conditions at least as profitably as any other fruit or agricultural crop, and that excellent results are obtained on soils which are classed as poor for other agricultural purposes, much of which is now carrying profitless scrub.

Climatic and General Conditions.

Undoubtedly the North Island from Hawke's Bay northwards offers the most favourable climatic conditions for viticulture, but there are also many parts of the South Island where grapes are or can be grown outdoors successfully, sheltered from the cold southerly winds by the high mountains and exposed to the sunshine all day long. These conditions exist in Central Otago—where grapes ripen earlier than in many parts of the North Island—and along the East Coast in favoured spots from Hampden to Picton and westward to Nelson and Motueka.

The aspect of a vineyard is of much more importance than the latitude or altitude. River-flats and low-lying land near to higher ground should, however, be avoided when possible because of the possibility of late spring frosts, and preference should be given to sunny slopes facing the north, north-east, or north-west. If, however, there is no choice, vines can still be grown by training them on trellises above the usual frost-level, or varieties can be planted which develop a second crop when cut back by frost. There are also varieties which flower later, when the risk of frost has diminished. In many parts of the North Island grapes can be grown anywhere when protected from the strong gales, but a difference in aspect in the same locality will often make as much as a fortnight's difference in the time of ripening grapes of the same variety.

Situation near Market.

It is an advantage in the production of table grapes on a commercial scale to plant the vineyards within easy reach of a market or alongside a well-frequented road. Similar positions are also an advantage where only wine is made, but they are not so necessary.

From a grape-growing point of view, New Zealand compares favourably with

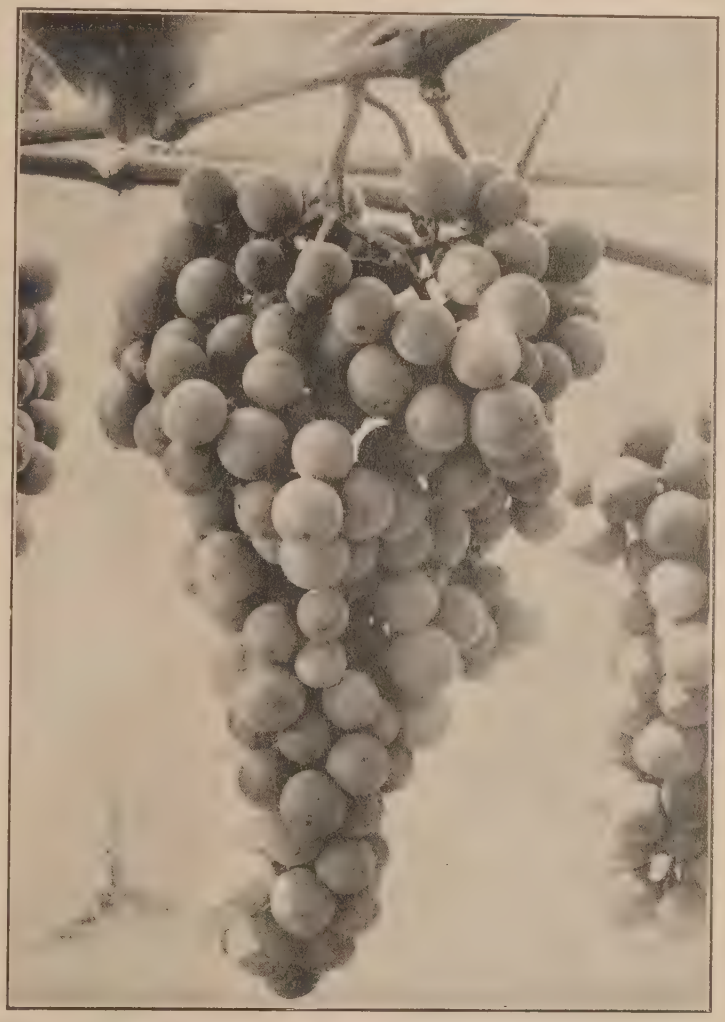

Fig. 2.—A well-developed bunch of grapes on one of the vines at Te Kauwhata Horticultural Station.

that part of France which produces the Champagne, Bordeaux, Burgundy, Hermitage, and Saumur wines. The grapes from which these wines and those of the Rhine are made grow to perfection in New Zealand, as do most of the vines of the "Precocious," "first" and "second" ripening-periods of Pulliat, which included more than nine hundred of the principal table and wine grapes. A few of the "third" period ripen in favoured spots in the North and South Islands, but very late grapes can only be ripened under glass in New Zealand.

Numerous varieties have been introduced from time to time by the Department of Agriculture, which, since its inception, realized the value of viticulture and endeavoured to encourage it by introducing and distributing vines that were likely to suit local conditions, and by giving instructions in both viticulture outdoors and under glass and also in winemaking.

Te Kauwhata Vineyard.

In 1898, on the advice of Mr. W. J. Palmer, Government Pomologist, 2½ acres of vines were planted at Waerenga (now Te Kauwhata) on poor gum land which had a natural growth of small manuka and fern, and around this nucleus the

present self-supporting experimental vineyard and cellars have developed, with their prosperous colony of table grape-growers in the immediate vicinity.

In the Te Kauwhata Experimental Vineyard a very valuable collection of vines has gradually been formed of varieties suitable for New Zealand conditions. In addition to vines that have already proved their value, some three hundred varieties of recent importation are under observation and are being released after approval to vignerons throughout the Dominion.

Cellar Experiments.

Both vineyard and cellar experiments are carried out for the benefit of viticulturists and winemakers. Cellar work at Te Kauwhata has proved that a sufficiency of acidity is developed in the wine varieties, which greatly assists in keeping the musts free from the harmful bacteria prevalent in wines in hotter climates, and, favoured with an autumn climate which eliminates the use of cooling devices or chemicals, a remarkably healthy and regular fermentation results. We are also favoured with a vigorous type of ferment which gives remarkably good results; in fact, conditions generally are highly favourable for the production of a good liqueur brandy as well as wine, were we permitted to produce it.

The British people, who formed the majority of the people who colonized these Islands, came from a country where grapes are not cultivated outdoors and where wine is not a common beverage, and they had no literature or traditions, beyond a little ancient history. This probably explains to a great extent why the culture of the vine outdoors for table purposes and the preparation of fermented and unfermented beverages, &c., from the juice of the grape has not made greater progress here.

Viticulture under Glass.

Viticulture under glass, in which Britain leads the world, has, on the contrary, kept pace with the increase of population, and we find vineries installed everywhere, even in the warmest parts of the Dominion. The outdoor culture of the vine, especially for wine-making, is at present mostly in the hands of Europeans from vine-growing regions.

The lack of tradition, however, is not an insuperable hurdle, as is shown at Te Kauwhata, where a colony of New-Zealanders of British origin has followed the lead of the Government and planted vineyards, from which they have been drawing incomes for some years past.

Another reason for the relatively slow progress of viticulture in New Zealand has been the destruction of vines by oidium and *Phylloxera*, and reconstitution has been greatly hampered by restrictive laws relating to the sale of wine and the risk of total prohibition with no compensation.

Industry Developing.

In 1906, during Signor Bragato's time, there were 550 acres of vines recorded, not including plots of less than a quarter-acre. In 1923 these were reduced to 179 acres, but since that time the acreage has gradually risen to approximately 655 acres, of which about half is devoted to growing table grapes. The actual demand for vines for planting is greater than available supplies, and outdoor viticulture, it is pleasing to note, bids fair to emerge from its prolonged infancy and occupy a normal position with its sister industry, the culture of vines under glass, with its 55,000 running feet of vineries and an annual production of approximately 585 tons of grapes.

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Yields in Pumpkin Crops.

E. M. Bates, Instructor in Agriculture, Gisborne.

CONSIDERABLE difference of opinion with regard to the yields in pumpkin crops have resulted in several crops being weighed in Poverty Bay this season and, with one exception, the areas photographed. The results obtained are both interesting and informative. In each case an average one-tenth acre (½ chain by 2 chains) was weighed, and the yield in tons per acre, the number of pumpkins per acre, and the average weight of the pumpkins was computed. The better crops in the district were weighed with a view to giving some indication of maximum yields.

The season has not been altogether favourable for pumpkins, being too dry in the early stages and too wet, with flood conditions, late in the season. Growth was promoted rather too late, and many of the pumpkins have cracked and are not keeping as well as usual.

Weighing Data.

The following are details of crops weighed, all being cattle pumpkins, with the exception of those in the Waipaoa area, which were Trumble eating pumpkins :—

Locality.	Tons per Acre.	Pumpkins per Acre.	Average Weight of Pumpkins.
			lb.
Hexton ..	40·6	1,600	56·8
Puha ..	39·2	2,000	43·9
Puha ..	38·2	2,880	29·7
Mangapapa ..	34·1	2,900	26·3
Ormond ..	23·4	1,070	49·0
Waipaoa ..	17·4	1,170	33·4
Waipaoa ..	12·7	3,550	8·0

Analysis of Results.

The above figures indicate that there is little correlation between the yields on the one hand, and the number of pumpkins per acre or the average weight of the pumpkins on the other. There is, however, a fairly close relationship between the number of pumpkins per acre and their average weight. It is doubtful whether maximum yields of pumpkins would reach much more than 50 tons per acre even in the most favourable season, although this statement is probably contrary to the opinion of many. It appears that, as the number of pumpkins per acre increases, there is a corresponding decrease in size and in average weights, thus limiting maximum yields.

Fig. 1.—Weighing pumpkins on Mr. J. Drummond's farm at Puha. The yield was 2,880 pumpkins and 38·2 tons per acre, and the average weight 29·7 lb. *[E. M. Bates, photo.*

Fig. 2.—Believed to be the heaviest pumpkin weighed in New Zealand and a record, the huge pumpkin in the centre tips the scales at 225 lb. The pumpkin on the left, which is deceptive, weighs 203 lb., and that on the right weighs 199 lb. They were grown by Mr. J. Atkins in the Ormond district. *[E. M. Bates, photo.*

The tremendous growth invariably made by the vines and leaves with pumpkins is again a big factor in limiting the maximum possible yield to a low figure in comparison with mangels, which have relatively small leafage. In the light of the above figures for some of the best crops an assessment of the average yield for the district gives a figure nearer 20 tons per acre than 25 tons, and this would be higher than the average for other less-favoured

districts. Over all, the average yield would probably be about 15 tons per acre.

An Economic Aspect.

On the small dairy-farms, even in favoured districts, pumpkins would be a less economic crop to grow than mangels if the latter can be given adequate attention. Adjoining 10 acres of pumpkins at Waipaoa which weighed out at 17 tons per acre were 3½ acres of mangels which weighed out at 83½ tons per acre.

The mangels on the 3½ acres would yield 290 tons, while the pumpkins on the 10 acres would yield 170 tons. The mangels would keep through the winter while the pumpkins in question were approximately 15 per cent. rotten when weighed at the end of May.

Pumpkins in areas such as the Poverty Bay district are particularly useful as a first crop for breaking in lea ground, especially the rush-infested areas on some of the medium-sized and larger farms. They have a definite place and a more general application in the farming of the Poverty Bay district than elsewhere, and they will always be an important crop.

Fig. 3.—Pumpkins on the Hospital Farm, Hexton. The yield was 1,600 pumpkins and 40·6 tons per acre, and the average weight 56·8 lb.

The necessity for procuring seed from prolific crops with pumpkins of good depth of flesh and good-keeping qualities cannot be overestimated. There is little doubt that the average yield of the pumpkin crops in this district could be raised by 5 tons to 10 tons per acre and the keeping-quality and feeding-value very much improved if careful selection of all seed was made from choice crops.

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Rye-grass in Southland.

W. Faithful, Fields Instructor, Gore.

THE success of practically any fundamentally sound business is dependent upon its ability to show a credit balance, notwithstanding opposition; the greater the opposition and competition the greater will be the necessity to increase production towards the maximum to ensure that this credit balance shall be attained. The business of farming in Southland is no exception to this rule, and to assist in attaining this desirable "credit balance" the first principle should be to create conditions suitable for the sowing and maintenance of high-producing pastures, which will in turn be an important contributing factor towards obtaining maximum production per acre.

It is the intention to consider here these pastures, particularly as regards the value of the types of rye-grass most suitable for inclusion in permanent or long-rotation pastures. To do this, it will be necessary for the sake of simplicity to divide perennial rye-grass into two main groups or classes, referred to respectively as Southland rye-grass and certified rye-grass.

Fig. 1.—Poorly grazed pasture after a succession of seed crops have been taken.

[*H. Drake, photo.*

Change in Type of Farming.

Forty years ago the typical Southland farm was worked on a short-rotation system, with most attention being paid to cereal cropping, particularly the production of oats. With the declining demand for this cereal, a gradual change came over the agriculture of the province in the direction of an increasing population of live-stock, demanding more attention to pasture establishment and management and leading to the adoption of a long-rotation system. This tendency has been very marked during the post-war years, as is shown by the substantial increases in the export of meat, wool, and dairy-produce.

Fig. 2.—A good general sward resulting from the sowing of the pasture mixture recommended.

[*H. Drake, photo.*

Southland Rye-grass.

For many years Southland held pride of place in New Zealand for rye-grass-seed production. Yields were excellent, germination was generally quite satisfactory, and the seed was greatly in demand. During investigational work into the types of rye-grass in New Zealand it was found that much of the Southland rye-grass was relatively short-lived and low in feed production—in other words, this rye-grass was not a true leafy perennial, but was a false perennial, producing a large amount of seed and stalk and a correspondingly small amount of leaf. When consideration is given to the seed mixtures used and the subsequent treatment of Southland pastures it will be readily appreciated that this lack of essential perennial characteristics of most of the Southland rye-grass is of considerable importance.

Seed Mixtures and Subsequent Treatment.

The grass-seed mixture usually used in Southland contains perennial rye-grass, cocksfoot, crested dogstail, Timothy, white clover, alsike, and sometimes red

clover, and the grass is frequently sown with a "nurse" crop of oats, rape, or turnips. If the "nurse" crop is oats it is harvested and the stubble is grazed, and if rape, lambs are fattened and any surplus used for hoggets. Irrespective of the "nurse" crop, the paddock is often closed up and a seed crop taken during the following summer, the stubble being used for grazing.

This system of early management is decidedly bad, so far as the establishment of good pasture is concerned, for two most important reasons—

(1) The "nurse" crop has a retarding effect on the clover establishment, and, when followed by a grass-seed crop, this has a still further depressing effect on the clovers.

(2) The Southland rye-grass at present under consideration is a comparatively short-lived type and produces its maximum at seeding, so that the pasture is left with a very sparse rye-grass content.

Not High-production Pasture.

It will be obvious that, consequent upon the lessening of the rye-grass content so early in the history of the pasture, its ability to become a high-production pasture is remote, because the sward will be dominantly crested dogstail, cocksfoot, white clover, and a little Timothy.

It will be admitted that this type of pasture has been found quite satisfactory in the past, where the system of grazing has been "set stocking" of large paddocks and where the top-dressing programme consisted of light applications, which were often not applied until there were signs of the pasture running out, but under this system of management the farm is not giving maximum production per acre.

Influence of Soil Fertility.

Brief mention must also be made of soil fertility and its bearing on Southland pastures. Southland soils are generally, from a rye-grass point of view, of comparatively low general fertility, and the mismanagement of pastures, as previously mentioned, is a contributing factor in keeping them at this low standard of fertility. Under a short-rotation system of farming it may be considered that the fertility of the soil is maintained by cultivation, but it is now widely appreciated that excessive cereal cropping depletes the fertility of the soil below the standard necessary to maintain first-class pasture. The poorer the type of rye-grass sown, the lower will be the standard of fertility required, within reasonable limits, but the resultant rye-grass pasture will be short-lived and of low productive capacity.

Fig. 3.—Brought-in tussock land in Southland carrying a permanent pasture sward with abundant white clover.

[H. Drake, photo.

Farmers in Southland have frequently remarked that if Southland rye-grass were very liberally top-dressed it would persist and produce exactly the same as the certified rye-grass; but such has not been the case where series of rye-grass strain plots, including both types, have been laid down (as has been done in many parts of the province) and top-dressed with superphosphate at 3 cwt. per acre plus carbonate of lime at 5 cwt.

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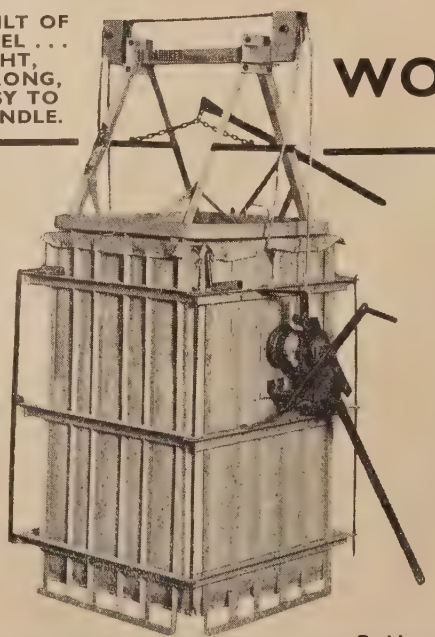

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per acre. In these trials the Southland rye-grass has failed, while the certified type has flourished.

Certified Rye-grass.

With the introduction of this type the rye-grass seed business of Southland received a considerable set-back because of the fact that the seed, under the influence of the usually humid conditions prevailing at flowering-time, was prone to attack by a fungus which seriously affected germination. In certain isolated areas, particularly the Waimea and Garston districts, where conditions are generally drier, it was found that germination was satisfactory unless an exceptional season with much rain at flowering-time was experienced. Apart from the hazard of low germination, the practice of harvesting seed, particularly in the early life of certified rye-grass pastures, is not to be recommended, as there is no doubt that seeding has a decidedly detrimental effect on the palatability of the rye-grass.

It has previously been mentioned that this rye-grass demands a fairly high standard of soil fertility, and if this standard is not sufficiently high this factor will be one contributing to the unpalatable condition of the rye-grass. From observations it seems that there is justification in stating that the seeding of this grass does make great demands on the fertility of the soil, as sheep have shown a decided dislike for seeded pastures for two years, and sometimes longer, after a seed crop has been taken.

Soil Fertility and Palatability.

In consideration of the above facts it will be obvious that there is a definite relationship between the existing soil fertility and the palatability of rye-grass. The system of cropping adopted in Southland appears to upset the balance of soil fertility in such a manner as to leave it unsuited to the requirements of certified rye-grass, particularly in the first year or two of the pasture's life. There is a natural adjustment of this balance of soil fertility continually going on, and the aim of the farmer should be to do all in his power to ensure that the eventual adjustment is at the stage where the association of certified rye-grass and white clover will flourish, rather than let the soil fertility be lowered to the point where it is suited only to the maintenance of inferior, lower-producing grasses.

To assist in overcoming the problem of palatability while the adjustment of soil fertility is taking place, the Southland farmer will find that the inclusion of about 5 lb. of Italian rye-grass per acre in his grass-seed mixture will be of considerable benefit, but there must be an annual application of at least one bag of superphosphate and 3 cwt. to 5 cwt. of carbonate of lime per acre to promote vigorous white-clover growth.

Fig. 4.—Permanent pasture put down with a nurse crop of rape.
[H. Drake, photo.

It must also be remembered that the pasture must be well treated in its first year. If sown in November or December it must have its quota of lime and phosphates in the following autumn. As with the stock, so with the pastures—if they are not given good attention and well fed when young, the expectations at maturity will not be realized.

Use of Certified Rye-grass.

The sales of certified seed are showing a steady increase, and many lines of rye-grass seed at present on the market but not bearing the departmental seal and tags could be traced to certified origin. For general pasture purposes commercial certified seed is advocated. A suitable general mixture would be (per acre) :—

	Lb.
Commercial certified rye-grass	25
Italian rye-grass	5
Cocksfoot	8
Timothy	3
White clover	2
Montgomery red clover	3

Given proper care in top-dressing and management, and not seeded in the first year of its life, this mixture will give a long-lasting and high-producing pasture. The longer grazing season secured from certified rye-grass as compared with uncertified makes the former of particular value to Southland, as, even in the colder districts, properly managed pastures of certified rye-grass give a great deal of late autumn grazing, will remain "winter green," and will come away early in the spring.

Can be Closed for Hay.

A further point in favour of this type of pasture is that in seasons of excess pasture growth it can be closed up for palatable hay. The use of more hay for the wintering of sheep is now receiving considerable attention by many farmers in this province, and hay from a dogstail-dominant pasture is usually very coarse as compared with hay made from the pasture advocated, particularly if the hay is made at the right time.

It is perhaps advisable to mention that the recommendations given for seed mixtures, management, &c., are made purely from a grazing and haying point of view and not for seed production for commercial purposes. When the object of the pasture is, in the main, seed production, mother seed certified rye-grass should be used, and if this is sown pure or with a poor white clover the grazing ability of the pasture between hay crops will not be outstanding, and it is unreasonable to condemn such a pasture from a grazing point of view.

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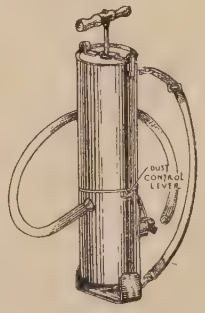

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Factors in Successful Farming.

(7) Farm Working and Maintenance.

W. N. Paton, Senior Investigational Officer, Accounts Division.

THE costs and management concerned in farm working and maintenance exclude work connected with capital expenditure and increase in assets. Broadly, therefore, what is involved is the maintenance of the productivity of the farm in terms of soil fertility, efficiency of live-stock, fixed improvements, chattels, &c. Costs necessary in order to keep pace with the progress made by the farming community as a whole, and land depreciation (or some such equivalent item) where the productivity of the soil cannot be practicably and economically maintained, would seem to be permissible of inclusion in working and maintenance costs, but these are matters as yet awaiting greater consideration.

Economy and Efficiency.

Two important points in successful farming as regards working and maintenance are economy and efficiency. With most kinds of farming common to New Zealand, labour (inclusive of farmer and family workers) represents the heaviest item of cost, and consequently labour efficiency of itself can vary returns materially. Instances of high labour requirement are fruit, tobacco, and hop farming, as well as, of course, market gardening. Purchased materials, including stock-food, rank high in poultry-farming and straight-out pig-farming. Although the successful farmer needs to practice economy in such things as materials and labour, he needs to guard against false economy, such as using too little fertilizer or not providing sufficient upkeep of plant, implements, &c. Expenditure on working and maintenance should be budgeted in order that all the requirements of efficient farming may be provided year in and year out. The full programme of work for the season ahead should be outlined and adhered to as closely as possible. These two aids in conjunction help to put more method into farming, and ensure better results.

Stability and Regularity of Returns.

On the whole New Zealand's climate rarely lets the farmer down seriously, average yields in our case being amongst the most consistent in the world. With the exception of wool and an occasional severe depression, our principal farm products do not vary drastically in price. Hence the New Zealand farmers' returns are probably more constant than those of any other agricultural exporting country. Our farmers should recognize the value of this comparative stability of farm returns and how it facilitates planned farming. Those kinds of farming in New Zealand most subject to variation in returns are straight-out wool-farming (and sheep-farming considerably dependent on wool), fruit, bee, and tobacco farming.

As regards regularity of returns, some kinds of farming provide returns during but a few months of the year, as instanced particularly in bee, fruit, tobacco, and hop farming. Straight-out fat-lamb raising and wool-farming are other examples of irregularity of returns. Dairy and poultry farming, on the other hand, are good examples of well-spread returns month by month throughout the season.

In those cases where stability and regularity of returns is poor, provision of working reserves from one season to another and during a season are vitally necessary to successful farming. These reserves not only need to be sufficient for farm working and living expenses, but also for upkeep and depreciation.

Unit Costs.

Successful farming is largely dependent upon efficient management. The effectiveness of management is measurable in terms of returns obtained and the working and maintenance costs involved. Before farming-costs can be rendered really intelligible and informative they must be standardized and presented in unit form. By making comparisons from data worked up in this way farmers are enabled to discover how they stand relative to others and to the general average. There are a number of bases employed in presenting unit costs. Where there is mainly only one product such as butterfat, honey, wheat, or potatoes, costs can be conveniently stated per pound, per bushel, or per hundredweight, &c. Where there are a number of products which are difficult to separately cost out, the per-acre basis may need to be used. With live-stock farming a very useful base to adopt in presenting costs and returns in unit form is the live-stock productive unit concerned, such as per cow, per breeding-ewe, per laying bird, per colony of bees, per breeding-sow, &c. The last-mentioned bases should be more generally employed as they possess considerable utility in providing a measure of the productivity of stock, and through stock of the land, and its economic value, as well as checking up on management, labour, &c.

In order to gain a more comprehensive view of farming-costs and of efficiency and economy in same it is necessary to present them in unit form employing different bases for the various purposes in view. The measurement of farming efficiency per medium of unit costs will receive further treatment in article ten of the series.

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Efficiency of Live-stock.

Efficiency of live-stock as converters of feed stuff into a given product or products vary considerably, and hence in analysing working and maintenance costs, or at least certain of these, it is important to obtain as close a measure as possible on this point. The value of much good work and management on land, pasture, and crops, &c., can in part be lost by utilizing poor-quality stock, and hence quality and efficiency in live-stock are essential to successful live-stock farming. The next two articles will deal with factors of economic importance with respect to these live-stock aspects.

Size of Enterprise.

Another outstanding important factor in working and maintenance costs is size of undertaking. It will be noticed that the term " size of farm " is avoided, as quite often area is a poor measure of the size of a farm from the productive viewpoint.

Generally speaking, the larger the proposition the more cheaply it can be run in terms of unit costs. There are three main reasons for this :—

(1) Quality for quality larger parcels of land are generally cheaper per acre to acquire ;

(2) Overhead in the way of fixed improvements, steading, implements, plant and equipment, sundry services and expenses, &c., reduces per productive unit with size of enterprise ; and

(3) Large propositions permit of better division, specialization, and hence utilization of labour than do smaller ones. There is one main disadvantage, however, regarding the larger farming enterprises. Where management per head of stock or per acre become less returns per producing unit are inclined to fall away. As one tends more and more towards the bigger farming units this latter aspect tends in time (there can be exception to this) to offset the combined advantages mentioned. From this it follows that somewhere in the range from smallest to largest farming enterprises there is an optimum point. These optimum points cannot be very clearly located for the reason that individual cases contain such a host of factors which vary the position. In dairy-farming the lowering of unit costs with size of herd is very marked as between one- and two-man farms, but it is not very appreciable for farms running herds greater than ninety cows. Some people consider a herd of 120 cows as the maximum, but cases exist where herds of upwards of 200 are being run very efficiently. There are not enough cases for which data can be obtained to get a really good idea of what the optimum sized herd is. Very large herds bring their troubles, however, and generally where there are showing very low unit costs management ability will be found to be extraordinarily good.

Level of Production.

In terms of the unit produced, costs are generally found to be lower with high-level than with low-level production farming. In other words, unit-produce costs are lowered by intensification and raised by " extensification " (the converse of intensification). The effect of intensification methods on unit costs is dependent on the kind of farming, location, soil fertility, value of land, produce-prices, &c. One needs to have some idea, for the conditions and circumstances involved, beyond what point intensification methods become unprofitable or too precarious. Where the balance between the productive factors is not as it should be, input applied (say a particular fertilizer) may bring about increasing output for each

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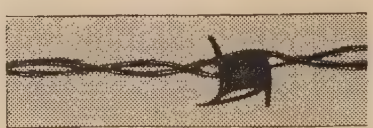

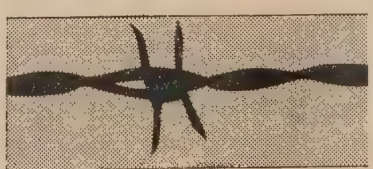

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succeeding unit of input. Carried far enough, increasing input will give place to decreasing output per unit of input. When a point is reached where a further unit of input fails to produce enough added output to pay for the unit of input applied, the limit to intensification under those conditions has been reached. Such a stage usually suggests that lack of sufficient balance in the productive factors again exists. Added input of some other factor or factors may make it possible to carry intensification some stages further. Some factors are beyond man's control, such as air, sunlight, energy rays, &c., and thus they at some stage or other must pull up intensification methods. In lowering unit cost of production through high-level methods it must be borne in mind that costs per acre and/or per live-stock-producing unit are raised. This statement sometimes presents difficulty to the uninitiated, since it appears to contain an apparent contradiction. Efficiency and economy need to be maintained all along the line in lowering unit costs by intensification methods, otherwise the limiting point will be reached earlier. It is also important to keep a proper balance in the exploitation (*i.e.*, production) chain. Therefore live-stock, pasture, and soil need to correspond in productivity, otherwise one tends to limit the effectiveness of the other.

Intensity of Stocking.

In New Zealand intensification methods in live-stock farming involve in the main control of grass-production and stocking. In endeavouring to obtain high production per acre of grazing area at the lowest possible cost per unit of the product sold, attention has been given not only to general efficiency and economy, but also to the balance between the two principal factors of intensification —namely, the head of producing stock carried per hundred acres and average production per head of producing stock. With dairy stock it has been found that usually it pays to concentrate more on stocking rather than on production per head. In following up on the point that live-stock, too generously fed, do not produce as cheaply per unit of the final product as when less generously fed, one needs to guard against any tendency to overstocking where production per head falls too heavily and/or health is impaired and productive life shortened. It is all a question of fine judgment.

Conclusion.

Working and maintenance costs relate very closely to management and to the conditions under which a farmer has placed himself from the outset. Provided his farm is right and the price is right, that he budgets his expenditure, provides for depreciation and working capital as necessary, gives close attention to efficiency and real economy, draws up and carries out a properly designed programme of work, keeps the necessary records, uses business and progressive methods, maintains a proper balance between all productive factors, and that he, above all things, makes himself a student of his vocation farm, working and maintenance and associated management problems will be successfully overcome.

Correction.

MUCH interest has been displayed in the article in the July issue of the *Journal* on "Farm Shelter and Shade in the Bay of Plenty District," but by an unfortunate error the authorship was wrongly acknowledged. The article was stated to have been written by Mr. C. Walker, Fields Division, Bay of Plenty, whereas the author was Mr. C. R. Taylor, Instructor in Agriculture, Whakatane.

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Ammonia Rectifier in Modern Refrigerator.

A. Powell, Cool Storage Officer, Wellington.

THE ammonia rectifier is a vast improvement on the old method of removing air and foreign gases from the ammonia system. Under the old method the purge valve was at the highest point in the condenser coils. When purging for air and foreign gases became necessary the refrigerator was stopped and the condenser water circulated over the condenser to liquify the ammonia gas. The air and foreign gases were located at the highest point of the condenser, and were released by opening a small valve, to which was attached a short length of hose with the other end in a bucket of water. In this way the air and gases were released.

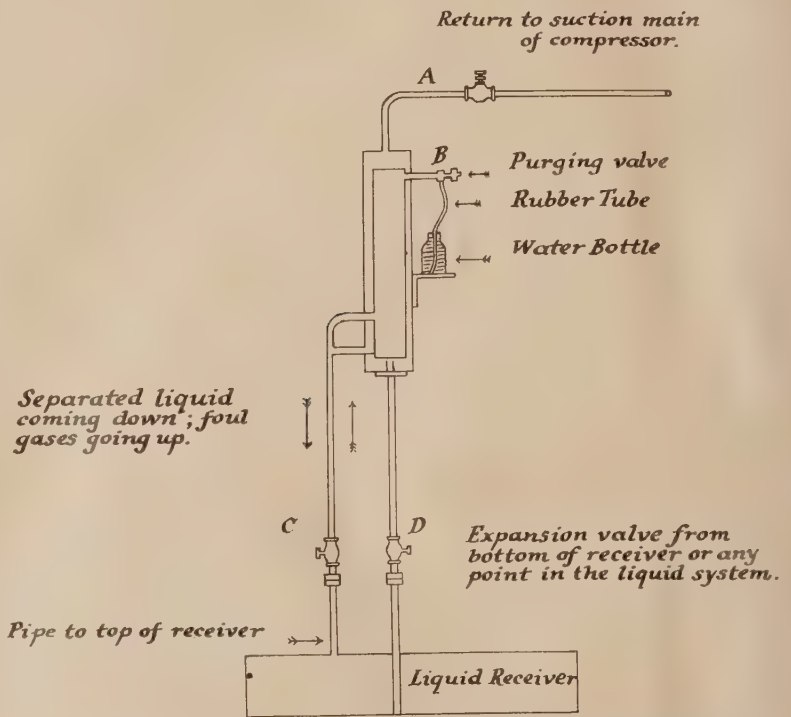
The ammonia rectifier, which is in use in many refrigerating-works, simplifies the process of ridding the ammonia of impurities. Further, there is no time lost, as the rectifier is discharging the impurities while the refrigerating plant is at work.

Air and Foreign Gases.

Air finds its way into the ammonia system when joints are broken and during repair to and overhauls of the refrigerating plant and pipe-lines. Foreign gases are created by the decomposition of the ammonia in the system into hydrogen and nitrogen. Moreover, the lubrication of the moving parts of the high-speed, enclosed type of refrigerator allows oil to mix freely with the ammonia, and this creates gases and causes decomposition of the ammonia.

The construction of the rectifier is quite simple, and the cost should not be more than £7 to £9, the four ammonia valves being the most costly part. As will be seen by the illustration, the rectifier consists of a double cylinder, four ammonia valves, and about 20 ft. of ½ in. ammonia pipe.

The inside cylinder is connected to the top of the ammonia receiver by the pipe marked C. Ammonia gas coming into this cylinder is liquified by the cooling effect of the ammonia gas which is expanding into the bottom of the outside cylinder by the pipe marked D, and is being drawn off the top by the pipe marked A into the suction pipe of the refrigerator. The liquified ammonia returns to the receiver by the same pipe (C) as is used to bring the gas into the inside cylinder.



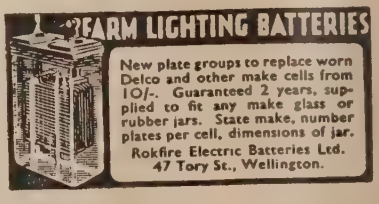
To operate: Open A and C to full extent, open D to get frost through suction to compresser, and then open B so that about one hundred bubbles per minute come from the tube. If, after a long run of separating, the water-level rises a little, cut down rate of bubbles to suit plant.

Escape of Gases.

Air and foreign gases are released by opening the valve marked B. They should be allowed to escape slowly so that there is no loss of ammonia. One decided advantage of this system of purifying the ammonia is that the rectifier is situated in the engine-room in a position where constant attention may be given to it without inconvenience or loss of time at critical periods of the year. The ammonia receiver may be in a vertical or horizontal position for connection.

The cylinders of the rectifier should be insulated by constructing an air-tight box about 4 in. larger in diameter than the cylinder. This space should be filled with granulated cork, and all joints should be sealed with a mixture of cork dust and heated bitumen.

The expansion pipe should be insulated with sectional cork or hair felt and bitumen. This also applies to all expansion pipes not doing work. If this is neglected there will be a loss in the efficiency of the refrigerating plant.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On the 23rd July the Jersey cow Ashvale Dreaming Stella, bred and tested by Messrs. J. and G. W. Dobson, Mountain Road, Lepperton, Taranaki, completed a period of 365 days on C.O.R. test, during which she is credited with a production of 12,689·1 lb. milk containing 815·73 lb. butterfat, with an average test of 6·42 per cent. Calving for commencement of test took place on the 23rd July, 1937, when the cow was 2 years 350 days old.

Her owners have also entered her for the 305-day division of the C.O.R. test, and her yield for 305 days works out at 11,317·8 lb. milk containing 711·51 lb. fat, the average test being 6·28 per cent. She is due to calve subsequent to test on the 16th August, less than thirteen months after calving for test, and was milked only twice daily during the whole of her testing-period. When these facts are taken into consideration the performance is obviously one of outstanding merit.

Should Ashvale Dreaming Stella calve on or about her due date she will become leader of the Senior Two-year-old Jerseys in both the 365-day and 305-day divisions of the Certificate-of-record Test, displacing Mr. D. Yandle's Punga Nui Joyce, who gained her certificate on 794·65 lb. fat in the yearly division and 690·13 lb. fat in the 305-day division.

On the sire's side the pedigree of Stella shows mainly Jersey Island strains, the well known Brampton blood being prominent. On the dam's side such proven individuals as Holly Bank Squire, K.C.B., and Lady Peggy are conspicuous. The sire and dam of Ashvale Dreaming Stella —Meon Lion and Meon Felicity—were both bred by Mr. C. H. Weston of New Plymouth.

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Citrus Pests: (3) (*a*) Red Mite, (*b*) Thrips.

W. COTTIER, Entomologist, Plant Diseases Division, Plant Research Bureau.

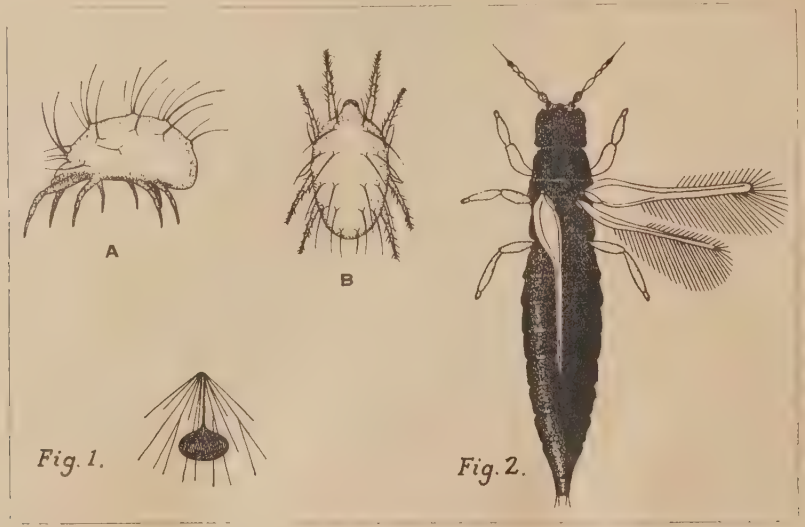

Fig. 1.—Stages of the citrus red mite—A and B, adult females; C, egg.
Fig. 2.—The adult of the citrus thrips (enlarged forty times). Note the fringed wings. [*Del.—W. Cottier.*

(a) The Citrus Red Mite.

TO our knowledge the citrus red mite has been a pest in New Zealand for many years. It is quite distinct from the red mite of deciduous fruit-trees, *Paratetranychus pilosus*.

Adult mites (Fig. 1, A and B) are very small, being about the same size as the diameter of a hole made by the point of a pin when just pressed into a piece of paper. The colour is purplish-red, and each mite is provided with a number of fairly long pinkish hairs on the back. The male mite is the same colour as the female, but is considerably smaller. The eggs of this mite are yellowish to deep red, and attached to the top of each egg there is a stalk almost twice as long as the depth of the egg. To the top of this stalk there are attached strands of webbing, and these are attached at their other ends to the leaf surface (Fig. 1, C).

Life-history and Habits.

From observations, this mite appears to pass the winter in the same way as it does the summer, all stages being present in the dormant season. As far as can be ascertained, no data are available on the length of the life-cycle of this mite. The period from egg to adult, however, is most probably in the neighbourhood of two to three weeks, so that many generations a year must occur.

The citrus red mite infests the foliage and sometimes the fruit. On the foliage colonies are usually found on the undersides of the leaves. Very little webbing is formed. This pest feeds by puncturing the leaf tissue with two needle-like instruments and sucking up the sap that exudes from the wound.

Nature of Damage.

The foliage of infested trees assumes a characteristic yellowed appearance (Fig. 3), due to the change of colouring matter caused by the impoverishment of the sap in the leaf. Badly infested trees have an unthrifty look because of the inability of the foliage to perform its normal function. The effect may also be noticed in a reduced size of the fruit.

Damage by mites is usually most apparent in hot, dry seasons, and in normal times usually shows up after Christmas.

Dispersion.

Under natural conditions dispersion is effected mainly by the wind. The bodies of mites are very small and light and are easily carried by air currents. Other means of carriage from tree to tree are on the feet and bodies of birds, by man himself—*e.g.*, by brushing against infested foliage and then against clean foliage—on implements, &c., and by anything that comes in contact with the mites and is subsequently placed in contact with previously uninfested foliage.

A common way in which the pest is introduced into orchards is on young nursery stock which has been taken from an infested orchard.

Control.

This species has been recorded from citrus trees only, and, in addition to New Zealand, has been recorded from America and Bermuda.

Control of this mite can be easily effected by a thorough spraying with a 1-per-cent. summer-oil emulsion.

(b) The Citrus Thrips.

This insect is very widely distributed throughout citrus-growing areas, and causes a large amount of fruit disfigurement. There are numbers of growers who do not know this insect, and thrips injury is often put down to other causes, such as leaf or fruit rubbing. Thrips injury is, however, quite characteristic, and once known can be easily recognized again.

Appearance of Insect.

These insects are very small, being about 1·5 mm. long when full grown. The body of the adult (Fig. 2) is narrow, somewhat flattened, and black, and is provided with two pairs of very narrow, whitish wings which are fringed with long hairs, as shown in the figure. When this insect is crawling on a plant the wings are folded flat along the back and appear as a longitudinal whitish streak down the middle of the abdomen. For the most part, the legs and antennæ are almost white. Immature forms are wingless, and are light yellow or almost white.

Life-history and Habits.

Thrips lay their eggs actually in the plant tissue, just beneath the outer covering. Eggs hatch in summer in about ten days, and the period from egg to adult requires about thirty-five days. Several generations per year therefore occur. In New Zealand all stages of the thrips can be found on citrus trees during the winter months.

Thrips are found on fruit and foliage. They prefer shaded conditions, and usually cause most damage on the inside of older trees where the foliage is dense. These insects feed by rasping the surface of the plant tissue and sucking up the sap that exudes from such wounds. This method of feeding causes the infested surfaces of fruit and foliage to assume a silvery appearance (Fig. 4). Thrips are very common at blossoming-time, and injury to the developing fruit at this period produces blemishes around the stem end.

At later periods other parts of the fruit are attacked, and blemishes appear on the sides, &c. On the fruit, injured surfaces usually become corky, and the dead skin becomes extensively cracked because of the growth that takes place from within (Fig. 4).

Fig. 3.—Showing the effect of red-mite attack on citrus foliage. The central leaf is healthy and green, while that on each side of it has been yellowed by mites. [*H. Drake, photo.*

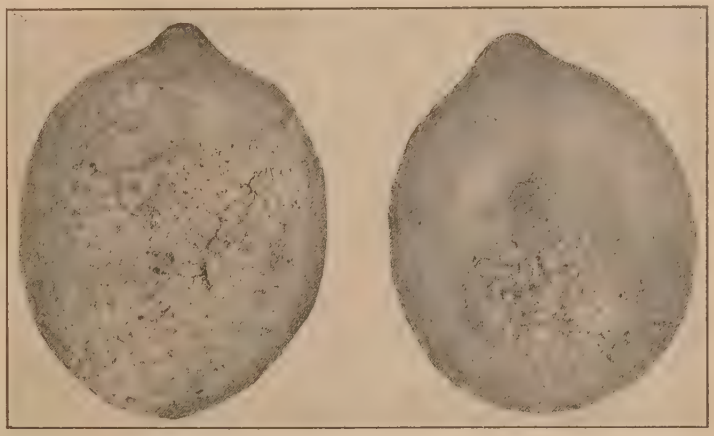

Fig. 4.—Silvered areas on lemon-fruits caused by thrips. Note the cracked, corky skin on the infested parts. [*H. Drake, photo.*

Hosts and Control.

The citrus thrips have a large list of host plants, some additional ones being peach, apple, tung-oil tree, rhododendron, viburnum, azaleas, gherkins, tobacco, vines, pear, and walnut.

Distribution is world wide.

The best spray for thrips is 1-per-cent. summer-oil emulsion plus nicotine sulphate, 1 part to 800 parts of the emulsion. It is important to apply this spray immediately after the petal fall of the main flowering, in order to kill the insects that might cause injury around the calyx end. Apply the spray during the season, as required, to prevent side injury to fruits.

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Feeding Farm Horses.

INSUFFICIENT attention to feeding is a frequent cause of trouble in working-horses. Little trouble is experienced on farms where horses are stall-fed, as a teamster knows the ration required by each horse under his care, according to whether the horse's work is heavy or light, so that the ration is varied to enable each animal to perform its work successfully. On the all-grass farm the horse's ration of grass is insufficient for heavy work, and during periods of hard work should be supplemented with a little more concentrated feed.

The customary feed used in New Zealand for horses is oaten-sheaf chaff, and as chaff cut from a 40-bushel crop of oats gives a good proportion of straw and grain it is a good standard by which to work. Forty pounds of such chaff will contain about 16 lb. of oats and 24 lb. of straw. For horses in light work, 12 lb. to 14 lb. of grain well mixed with straw chaff should be sufficient for each day, and, as the weight of the work increases, so the weight of grain should be increased. If the work is very heavy it is advisable to add oats to the oaten-sheaf chaff, thus cutting down the proportion of straw. Each horse should be given the exact ration required, and any chaff left after a feed should be cleaned out.

Long and Strenuous Day.

The day of a horse in hard work is long and strenuous. At 5.30 a.m. the horses are let in to the stable and given a small feed of about 7 lb. of oaten chaff. After grooming and harnessing, make the feed, if any remains in the box, up to 7 lb. of oaten chaff; and at noon a full feed of 7 lb. of oaten-sheaf chaff and 3 lb. of oats should be given. On returning to the stable at 5 p.m. give the horse a feed of 10 lb. of oaten-sheaf chaff, and at 7 p.m. make any feed in the boxes up to the equal of 7 lb. of oaten-sheaf chaff. At 8.30 p.m. the horses should be turned out. Always allow horses a small drink before feeding.

In the North Island the majority of horses are fed entirely on grass. This method of feeding, although contrary to all hard-feeding methods, is justified, as grass is the cheapest feed available and the horses are not called upon to work such long hours or perform such heavy work as the grain-fed animals. Normally, horses work satisfactorily on this feed, but in times of heavy rush work grass-fed horses are often mishandled and abused. They are taken straight from lush grass, and, instead of being allowed to rest for an hour to allow them to digest some of the food, are put immediately into heavy work.

This practice causes untold suffering, and an observer will have noticed the profuse sweating and distressed condition of horses in the first hour of work. Horses on some of the poorer farms have insufficient feed in the winter, and as they cart out the hay or ensilage to the other stock they only get the leavings, which are of inferior quality.

If the working-horses were fed a little concentrated feed during periods of hard work they would retain their vitality throughout the winter and in the long harvest-days. A most suitable supplementary feed for horses in heavy work is rolled oats. Fed at the rate of a small double handful in the morning, two large double handfuls at midday, and a little in the evening, one sack of oats for each horse, plus plenty of good grass, will suffice to bring a horse through the harvest or other short period of hardship.

—W. T. Brown, Instructor in Agriculture, Hamilton.

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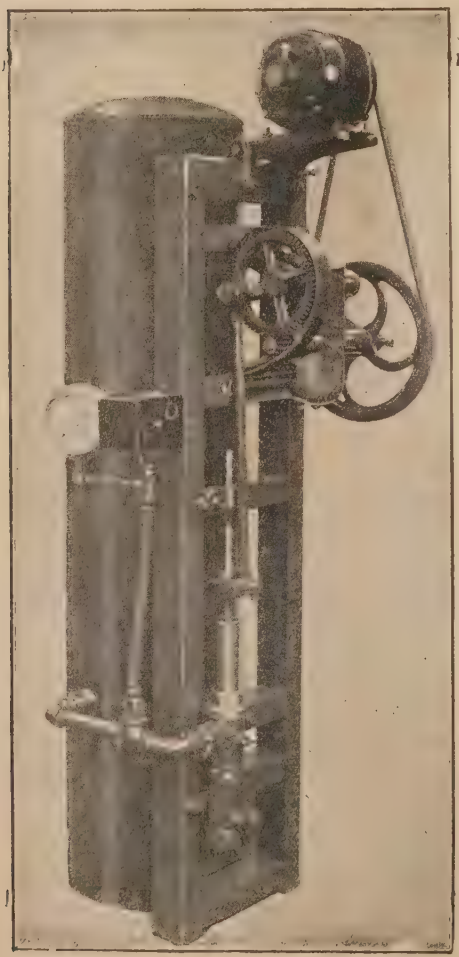
Harrowing of Pastures.

IN North Taranaki, with its light volcanic soils and general tendency to weed invasion of pastures, two outstanding practices have evolved from a welter of opinions and theories as to the benefits to be derived from the use of the many types of harrows advocated for grassland.

Leading farmers with high-production pastures have abandoned drastic harrowing in favour of the efficient spreading of animal droppings before these have lain long enough to damage the sward. For this purpose, light tripod and chains or chain harrows alone do very satisfactory work so long as the operation is carried out while the droppings are still soft.

Fig. 1.—A light set of harrows drawn by a tractor.

Although farmers are well aware of the damage done where droppings are allowed to lie undisturbed, and are also mindful of the value of harrowing on the evenness and density of the sward, most find that the time required for harrowing



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is difficult to fit in, particularly where horses are used. The wider the set of harrows which can be used for manure spreading the quicker the ground can be covered, but the lighter the harrows the more essential it becomes to keep the harrowing well up to the movements of the stock around the farm.

Light Set of Harrows.

Figure 1 shows a light set of harrows drawn by a tractor, the operating-cost of which on flat areas is about 3d. per acre. The set is 20 ft. wide, and is excellent for spreading droppings while they are still soft or after good rains. Similar horse-drawn sets are being operated very successfully on many dairy-farms. The idea is to combine the effective spreading of manure with light draught, so that a big area can be rapidly covered as soon as grazing or feeding out on the area is completed.

It is interesting to note that where the sward is particularly vigorous harrowing is not required during the busy period through the spring and early summer, as the grass lifts and breaks up the soft droppings with no assistance from the harrows.

On farms lacking in good-type rye-grass and white clover progressive farmers are successfully using a drastic type of harrow to prepare a seed-bed for surface sowing of additional grass and clovers. For this purpose a harrow which will tear out much of the rubbish in the form of Yorkshire fog, rib-grass, and brown-top, and will lift up and spread some of the surface soil as a mulch for the seed-bed, is favoured.

Choice of Harrow.

In choosing a harrow for this purpose the farmer must know what is required in the way of a seed-bed to get good results from the sowing of additional seed. His choice should then be the harrow which will give the desired results in the shortest time with the tractive power he has available. Two strokes of a suitable harrow on a closely grazed area are generally given, and from 15 lb. to 20 lb. of certified perennial rye-grass, 3 lb. of crested dogstail, and 1 lb. to 2 lb. of certified white clover are sown. A light harrowing to cover the seed and a rolling to firm the surface make for a quicker strike.

Top-dressing at the time of seeding is often carried out, and a spell of from two to three weeks given, according to the weather, before grazing off. Care is taken to graze the area later in such a way as to keep down the growth of the original sward and so prevent smothering of the young rye-grass, &c.

Both autumn and spring sowings have been successful in North Taranaki, but early autumn reseeding is generally favoured. One farmer has successfully improved by this method more than 70 acres in the past few seasons, and the outfit illustrated, which was recently acquired for the purpose, has speeded up operations, 30 acres being dealt with last autumn.

Drastic harrowing without reseeding leaves the sward open for weed invasion, particularly where ragwort and blackberry occur. The reseeding further paves the way to much better returns from top-dressing.

—A. G. Elliott, Instructor in Agriculture New Plymouth.

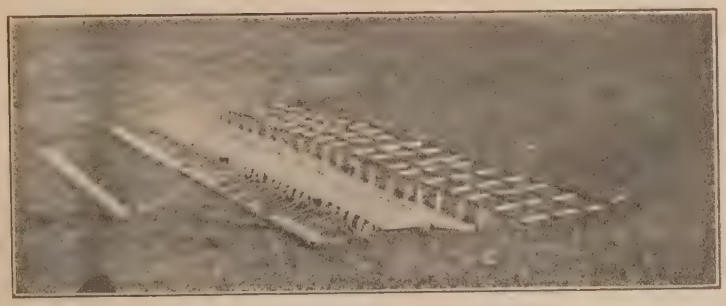

Fig. 2.—A close-up view of the harrows.

Fig. 3.—A horse-drawn sun-prong pasture-renovator.

The Department has received a copy of *The New Zealand Farmers' Book-keeper, 1938–39*, published by E. H. and C. H. Lambert, Whangarei. The object of the proprietors has been to set out in the simplest form the various headings under which income and expenditure should be classified, so that, at any period of the year, whatever information may be required can be supplied correctly.

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Establishment of Clovers.

WHEN the specially selected pedigree strain of white clover was first distributed in the Rangiora district most of it was sown on wheat crops after the spring harrowing. A normal dry summer and autumn followed, and the establishment in practically every case was very poor. At places where the winter is at all severe the spring is the best time to sow clovers, as the rooting system becomes well established before the cold weather comes, and the plant is able to withstand the lifting action of frost.

Good results are obtained with red clover by broadcasting and harrowing in 3 lb. to 4 lb. of seed on a cereal crop in the spring after rolling. The taller plants protect the clover, and if the cereal crop is not too thick valuable stubble for ewes and lambs is obtained. It must be remembered that red clover is deep-rooted and can look after itself when the protecting cereal crop is cut. White clover, on the other hand, is relatively shallow-rooted, and does not tolerate shading to the same extent.

Fig. 1.—A pedigree strain of white clover spring-grown at 3 lb. per acre with 7 lb. of rye-grass. It was limed at ½ ton per acre before sowing, and 1 cwt. of superphosphate was used with the seed.

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The cereal crop removes a great deal of moisture from the soil, and after it is cut the white clover is suddenly deprived of its protecting shade and has to struggle on its own in a parched topsoil at the driest period of the year. Unless rain follows soon afterwards there is a high percentage of plant mortality.

The autumn sowing of clover in a pasture mixture gives a fairly satisfactory establishment of clover, although at this time of the year rye-grass is rather aggressive. The earlier the pasture is sown the better the clover. When white clover is sown for seed-production the best results are obtained by sowing it alone or with a few pounds of rye-grass in the spring. The inclusion of 7 lb. or 8 lb. of rye-grass in the mixture helps to prevent the ingress of weeds and provides a certain amount of feed.

A dressing of a ton of lime to the acre, harrowed in just before the seed is sown, is beneficial, and if the seed is sown on a fine, well-rolled seed-bed with 1 cwt. or 2 cwt. of superphosphate it is being given the best possible conditions.

A. S. Nash, Instructor in Agriculture, Rangiora.

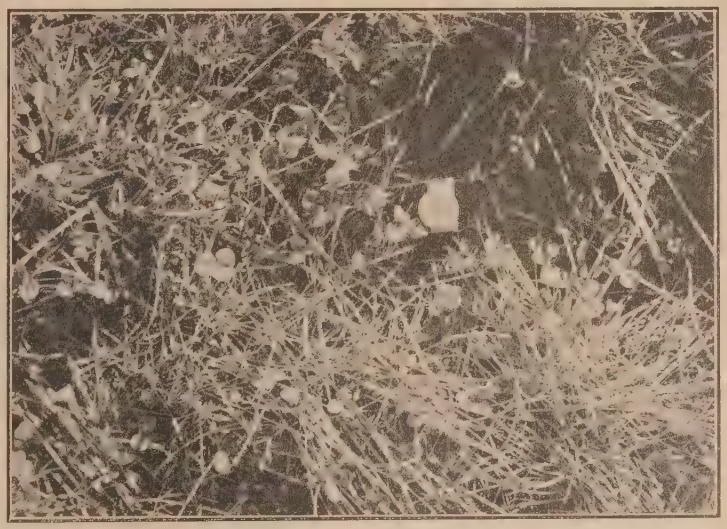

Fig. 2.—The same seed as in Fig. 1 sown the following autumn on the same farm. The mixture was 2 bushels of oats, 1½ bushels of rye-grass, and 3 lb. of white clover per acre, with 1 cwt. superphosphate. Note the two-shilling piece.

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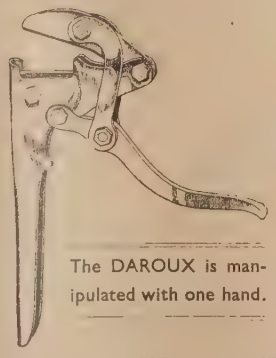

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Problems of Wheatgrowing.

FROM the wheatgrowers' point of view the present season in South Canterbury has been one of the worst ever recorded.

Beginning with very dry conditions in the spring and early summer and continuing with heavy falls of rain right through the harvest period, the weather caused the wheatgrower much worry and expense. This was followed by further rain during the months when the land was in the course of preparation for the sowing of autumn and winter wheat crops.

In some cases growers have been able to get their crops sown, but this has been of doubtful value, as many have had their wheat land flooded, with a consequent loss of large portions of their areas. The question that will be exercising the mind of the wheatgrower at the present time is what varieties are to be sown.

Autumn and Winter Wheat.

Autumn and winter wheat give the best results when sown in May and June. A few crops are sown in July, but most practical farmers consider that if their crops are not in by the first week in July it is better to leave sowings until August. July is the dead month of the year from a growth point of view. The days are short and cold and practically all growth has stopped, so that there is no great advantage in sowing, as the wheat in all probability will lie dormant until warmer conditions prevail.

The next point to consider is what varieties to sow. If it was the intention to sow the Hunter variety and the crop has not been sown, the Cross 7 variety would be the best to put in. The Hunter variety is generally sown on fairly strong land. This being so, Cross 7, because of its resistance to lodging, is recommended.

The wheatgrower is badly in need of a suitable spring wheat. There are such spring wheats as Marquis and Jumbuck, but these varieties are not altogether suited to all conditions. They are quite suitable farther north, but in most parts of South Canterbury, particularly the Downs wheat lands, their yield is rather poor. In the case of Jumbuck, the weakness in the straw is a disadvantage.

New Varieties.

The new variety Tainui is a suitable wheat for South Canterbury conditions, but unfortunately there are insufficient pure lines on the market to meet requirements. Dreadnought is a variety which is grown fairly extensively in South Canterbury, particularly in the Willowbridge and North Otago districts. This variety can be sown in August. A greater seeding per acre is necessary, up to 2 bushels to 2½ bushels per acre being recommended. The two varieties commonly grown in the spring are Solid-straw Tuscan and the more recently introduced variety, Cross 7.

When sown in the spring on fairly strong wheat land, Solid-straw Tuscan has a tendency to lodge, and where this is the case Cross 7 is recommended. Cross 7 is shorter in the straw than Tuscan, stands very erect, and only under exceptional circumstances will it lodge. It is slightly earlier than and has a yield equal to Solid-straw Tuscan. However, it has one disadvantage. If dry conditions are experienced during the early summer and excessive rain follows, the weed growth is apt to grow as high as the crop. This applies to areas where sow-thistle is prevalent. One or two cases were noted last season where this was the case, and great difficulty was experienced in getting the crop into a fit condition for threshing. These circumstances were, however, exceptional and not at all indicative of a normal season.

Spring-sown Wheat.

Spring-sown wheat does not tiller out to the same extent as autumn and winter sown crops, so that a slightly heavier seeding per acre is necessary—up to 1¾ bushels or 2 bushels per acre, together with 1 cwt. of superphosphate.

Any land that has been worked down ready for sowing will require good, deep cultivation and harrowing, and in some cases a light ploughing with after-cultivation would be advisable.

—C. C. Leitch, Instructor in Agriculture, Timaru.

The following appointments have been made to Rabbit Boards—Blue Mountain Rabbit Board: J. B. Dick, L. F. Jermyn, W. L. Oswald, H. J. Palmer, M. Parsons. Waihopai Rabbit Board: W. R. Cresswell, J. D. Rudd, C. O. T. Rutherford, C. G. Teschemaker. Awatere Rabbit Board: I. H. Cameron, C. G. L. Hunt, A. D. Rutherford, J. W. B. Stevenson, A. D. West. Redwood Rabbit Board: J. Balfour, R. Forsyth, R. G. Murray, W. Payne, H. H. Vavasour. Flaxbourne Rabbit Board: J. W. Kennington, C. D. Mathews, W. J. Marfell, G. Taylor, H. J. Thomson.

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The Conical Haystack.

THE conical haystack has greatly increased in popularity during the past few years on farms near Auckland. It is used mainly for storing hay harvested from small fields up to 4 acres or 5 acres, and in cases where the hand-fork is still the only method of raising hay from the ground. Being small and offering a great surface to exposure it easily throws off heat generated after stacking, and the possibility of its firing is less than is the case with the large, oblong stack.

The roof, being steep-pitched, will shed rain-water and will prevent it from penetrating. Especially is this so if the roof has been well raked. All that is necessary in covering after raking is to prevent penetration of the rain at the top. This is done by placing a bag cover, generally made from one or two split fertilizer-sacks, on top and attaching weights to keep it in position. The conical stack, although small, will hold a surprisingly large amount of hay. It is usually about 5 yards in diameter and 15 ft. high when settled.

One commonly experiences waste when opening the oblong haystack. Extra precautions are necessary to prevent rain-water from penetrating the roof at the danger-line, just above the eaves. If it penetrates there it generally runs to the centre of the stack and to the ground, destroying much hay. I have yet to see a conical stack where the water has penetrated. Generally, the hay is of good quality, because great heat is seldom generated.

Two conical haystacks. The nearer one is uncovered, and the far one has its cover still attached.

The photograph shows two conical stacks, the nearer one of the two being uncovered and the rear one with its cover still attached. The advantages of the conical stack are that they give a reduction in waste, there is less risk of heating, and the problem of covering is easier. Until the farmer is accustomed to them they may be more troublesome to build than the ordinary oblong stack. On farms where labour is scarce and where there is no lifting apparatus, the small conical type of stack will be found an excellent means of storing hay.

—J. E. Bell, Instructor in Agriculture, Auckland.

Caterpillar Plague in North Auckland.

EARLY in the autumn of this year several districts in North Auckland were afflicted with a plague of caterpillars, the effect of which was to denude good, standing pastures and render the paddocks completely worthless. Fields of standing paspalum were eaten completely to the ground, and even the unpalatable rush was not immune to their attack. Serious losses in production were experienced by dairy-farmers whose properties were affected.

The caterpillar responsible for the damage was the army-worm, *Cirphis unipuncta*, which derives its name from its habit of marching across the paddock. It is blackish in colour, with a broad white lateral band, and attains a maximum size of about 1½ in. Previous plagues of this insect have been reported on occasions from North Auckland, and minor outbreaks are fairly common. The plagues which occur in Canterbury are due to a different species of army-worm.

In the present instance the districts had recently been subject to floods, and it was noticeable that only the flooded areas were affected. The reason for this is unknown. The caterpillar is principally a grass and cereal feeder, and is not likely to be abundant in the bush of the catchment area, so that eggs are probably not brought down but are hatched out by the effect of flood-waters.

Methods of Control.

The control is extremely difficult, and no really effective method can be suggested. Some farmers applied crude oil by means of a flame-thrower, making a break about 1 yard wide around the affected area. Caterpillars entering this area were killed, but in a short time the oil was dried up by the sun and wind, and the march continued unimpeded. The use of lime was similarly ineffective.

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These caterpillars reached a paddock on the opposite side of a metalled road, crossing two deep ditches as well as the hot, dusty road. Spraying the water in the ditches with oil had no effect, and poisoned bran, &c., cannot be broadcast because of the possible effect on stock. In any case, this would not be a complete check.

When a similar plague affected the Canterbury District a method recommended was the ploughing of a deep furrow round the affected areas, the steep side being nearest to the line of march. Pits are dug at intervals along the furrow. The caterpillars fall into the furrow and pits, and are killed by trampling in the furrow, by spraying, or by any other means applicable. The use of poison bran—25 lb. of bran to 1 lb. of white arsenic or paris green—scattered in the furrow should be used in conjunction with this method. Treatment with the flame-thrower would be an effective method of killing trapped caterpillars.

Checking the Spread.

The furrow method is effective in checking spread, but no method can assist in killing the caterpillar at work. In this case, unfortunately, the ground was so hard after dry weather that ploughing was practically impossible. Many of the paddocks affected had a paspalum sward, and the damage done was not irreparable. With a weaker grass it is quite possible that paddocks might require re-sowing. Treatment recommended in the above case, therefore, was :—

(1) Use the "furrow" method if possible.
(2) In all cases "nurse" the paddock carefully, and do not harrow and apply top-dressing in local use to all paddocks affected.

Many farmers were apprehensive of a return of the plague in the following year, but this is not likely. The climatic conditions this summer were ideal for insect pests, and it is not probable in the light of past experience that such an intense invasion will occur again for many years.

—O. M. Shroff, Instructor in Agriculture, Auckland.

Care in the Purchase of Certified Seed Potatoes.

IN the May issue of the *Journal* there appeared the list of growers whose potato crops were provisionally certified this year.

To complete certification it is necessary for the growers to class their seed potatoes to meet the Department's requirements in regard to grade standards and to obtain the official certificates, which are in the form of a tie-on label when sacks are used as containers, or sticker labels when crates are used.

Growers are at liberty to make more than one grade, but the produce comprising each grade must be reasonably uniform and comply with the maximum and minimum tuber-size limits for the particular grade.

When ordering certified seed, intending purchasers should therefore give some indication of the grade or size of tuber required. They should also ensure when the produce is delivered that each container, whether it be sack or crate, has the official certification attached.

In the absence of the certificates the purchaser has no guarantee that the produce is genuine, and, as instances have come under notice of seed which has not the slightest claim to be recognized as certified seed being sold as such, purchasers should safeguard themselves by plainly stating "certified seed" when ordering, and should refuse to accept delivery if the containers are without the official certificates.

The Department has also considered the interests of the kitchen gardener, who naturally requires small quantities of seed. In order that he may obtain the genuine article provision has been made to allow approved merchants or growers to pack certified seed of 14 lb., 28 lb., 56 lb., and 112 lb. lots into approved wooden sprouting-crates.

This work is done under departmental supervision, and each crate is labelled with the official certificate and sealed. Purchasers of certified seed potatoes in crates are therefore reminded to ensure that the seal is intact on taking delivery.

Certified seed potatoes crated in a Dunedin store for town gardeners' requirements. Note the sealed crates on the left-hand side.

—J. O. Wallace, Instructor in Agriculture, Dunedin.

Subterranean Clover on Unploughed Land.

DURING the past two or three years subterranean clover has been extensively sown over a very wide area in the Ashburton district, particularly on the lighter class of land in the county, which is devoted almost entirely to sheep-farming. Many different methods have been adopted in an endeavour to establish this clover. To mention a few, it has been sown with oats, turnips, and rape, and with the ordinary pasture mixture. Some farmers have drilled the seed, others have resorted to broadcasting, in all with varying degrees of success.

A few cases have come under the writer's notice where attempts have been made to establish subterranean clover without recourse to the plough. Eventually the tendency on most of our sheep areas is for the sward to revert to sweet vernal or brown-top dominant, with an admixture of flat weeds, suckling clover, and hair-grass. It is thought that if subterranean clover could be introduced into these areas without using the plough it would lessen considerably costs of establishment.

Procedure Followed.

The procedure followed was to double-grub the worn-out pasture in January or February or thereabouts, roll, and then drill the seed with 1 cwt. or 2 cwt. of reverted phosphate or superphosphate per acre. The success attending this method of establishment has been poor. In each case noted a reasonably good strike has been obtained, indicating that neither the seed nor the fertilizers used have been at fault.

Relatively heavy frosts can be expected in this county from the beginning of May onwards, and it would appear that the young clover plants have not advanced sufficiently before these occur. Where the clover has been sown on ploughed ground which has been well cultivated and probably fallowed for some time it usually makes rapid growth and develops a good rooting system before the winter. On freshly grubbed land, however, growth is slow. Many of the plants possess a stunted appearance, and the rooting system is apparently so poorly developed that the succession of frosts merely lifts the plants, with the result that very few survive the winter.

Department's Trial.

In a trial laid down by the Department last February the results obtained have been somewhat similar to those experienced on a field scale. Not only is the growth backward, but the clover has had to contend with much competition from flat weeds and sweet vernal. At the present time (June) there are many plants which have not passed the three-leaved stage, and the chances of these surviving the winter are somewhat slender.

In the light of evidence so far available, farmers are recommended to confine their sowings of subterranean clover to ploughed land. It is possible that grubbed land, provided it is fallowed for some time, may be satisfactory, but grubbing followed by immediate sowings should not be considered.

—G. K. McPherson, Instructor in Agriculture, Ashburton.

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ONE OF MANY TESTIMONIALS.
Amberley, June 14th, 1937.
Dear Sirs,—During the last four seasons I have been drafting Mr. C. A. Mowat's lambs that have been castrated and tailed with his instruments, I have never had a reject owing to arthritis or any of the ailments sometimes caused from marking with the knife. The lambs are well grown and healthy in every respect.
(Signed) DONALD McDONALD,
North Canterbury Freezing Co.'s Representative.

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Pasture Establishment on Blackberry-infested Land.

BLACKBERRY has taken charge of large blocks in parts of the Bay of Plenty. This is particularly noticeable on partly drained swamps and adjacent country in the Tauranga County.

Little effort has been made so far to keep the weed in check where such land is Native owned, and consequently, with soil fertility and climatic conditions favourable, the spread has been so rapid and the growth so dense that stock are unable to traverse many of the areas.

In view of these circumstances it will be of considerable interest to many farmers to hear of a successful method of pasture establishment on such land, and I have outlined below the procedure adopted by Mr. M. G. Cruickshank, Te Puke, Bay of Plenty.

Operations Started.

In October, 1936, Mr. Cruickshank began operations on part of a block of 80 acres carrying a dense growth of blackberry. The first procedure was to roll the growth down by driving a tractor over the portion he intended to grass in the autumn. No implement could be drawn, as the density of growth made it quite difficult enough to get the tractor over the country by itself. When the growth, which exceeded 6 ft. in places, had been rolled down he disked the blackberry with tractor disks drawn by the tractor. The object of disking was to cut up the blackberry so that it would dry out and subsequently carry a fire.

In early December the blackberry was burnt, and a fairly good fire, which cleaned up most of the stalk, was obtained. Naturally, fresh growth appeared from the blackberry crowns. In order to combat this growth Mr. Cruickshank stocked the area with dry ewes in good condition at the rate of ten ewes per acre. These sheep were kept on the blackberry, apart from short breaks on to neighbouring grassland, until the middle of March.

Sowing of Seed.

The sheep were then removed and the area thoroughly disked to provide a seed-bed for pasture establishment. At the end of March the following mixture was sown with 3 cwt. superphosphate per acre :—

	lb.
Certified perennial rye-grass	30
Certified white clover ..	2
Paspalum	8
Total per acre ..	40

Since the sowing in March, 1937, no blackberry-control has been necessary on this country.

Fig. 1.—A view showing a portion of the area grassed after sheep control. Note the freedom from weed up to the fence. Beyond the fence lies undeveloped blackberry country.

Fig. 2.—A view showing reinvasion by blackberry where no sheep control was practised. This was carrying good pasture at first, but is now smothered in blackberry.

In striking contrast to the above is Mr. Cruickshank's experience with a further area of blackberry country which was handled in the late summer and autumn of 1937. The same procedure in rolling, disking, and burning the blackberry was followed, but instead of stocking with sheep the area was disked up after burning and sown down with the same mixture as the first area. Since then reinvasion by blackberry has been a serious problem. The area has been practically smothered in further growth, and much labour has been expended in cutting and grubbing plants. Even so, further growth continues to be troublesome.

Summer Stocking.

Mr. Cruickshank firmly believes that summer stocking with sheep on the burnt areas provides the solution to blackberry-eradication on this country, and his results undoubtedly support the contention. As the sheep require to be punished to some extent to ensure that all plants are kept well under control, he considers that only well-conditioned stock should be used. For this reason he selects dry ewes rather than those that have reared lambs.

—C. Walker, Instructor in Agriculture, Tauranga.

Talking Pictures at Field Day.

TALKING pictures have now been introduced as part of the programme for agricultural field-days. For the first time in New Zealand talking pictures were shown at the field-day organized by the Horowhenua Young Farmers' Clubs and Farmers' Unions at the Levin Racecourse on 21st July, and it is hoped to extend this form of instruction to other field-days in the Dominion, providing suitable facilities are available.

These compact, portable talking-picture units have recently been introduced by Mr. R. B. Tennent, Director of the Fields Division, who superintended the screening at Levin, which was made possible by transforming the basement of the main grandstand into a miniature theatre. Those who attended were enthusiastic over the possibilities of this new form of practical instruction. With a microphone attachment Mr. Tennent commented on various points brought out in a silent film.

More than two hundred farmers, young and old, attended the field-day, and were welcomed by the Mayor of Levin, Mr. P. W. Goldsmith, who was introduced by Mr. H. Lancaster. The instructional programme opened with a demonstration on dairy cows by Mr. T. Ranford, of Whakarongo, a prominent Jersey breeder. Mr. Ranford described the points to be considered when purchasing a dairy cow, and stressed the desirability of forming an understanding of the herd. The demonstration was followed by a judging competition for young farmers.

The address by Mr. R. P. Connell, Land Utilization Officer, on "Some Aspects of Dairy-farming Costs," created considerable interest, as also did the lecture on "Subterranean Clover" by Mr. C. J. Hamblyn, Fields Superintendent, Palmerston North. Mr. Hamblyn dealt with the various strains and discussed the type of country suitable for sowing.

After lunch an address on "Grasslands Overseas" was given by Mr. E. Bruce Levy, Director of the Grasslands Division, who illustrated his talk with a number of lantern-slides. Mr. Levy showed a large number of rural scenes from Great Britain and the Continent which he secured during his recent tour abroad, and gave an informative comparison of New Zealand grasslands with those overseas.

Mr. M. J. Scott, Superintendent of the Pig Industry, gave a short address on pig-keeping, emphasizing the importance of co-operation between the farmers and the Department in furthering the interests of the industry.

Following a demonstration on Southdown sheep by Mr. G. W. Mumford, of Shannon, a well-known Southdown breeder, young farmers took part in a judging competition. The field-day concluded with a lecture on "Stock Troubles" by Mr. E. E. Elphick, Veterinarian.

The field-day was well organized and was comprehensive in its scope. Mr. H. Denton was a capable officer-in-charge, and the following young farmers acted as chairmen for the various lecturers: Messrs. V. C. Lewis, Lynch, W. Guerin, A. J. McLeavey, M. Holmes, and H. Denton. Mr. G. F. Gimblett was the secretary of the committee.

At the conclusion of the programme Mr. A. J. Galpin, Department of Agriculture, announced that an outstanding field-day was to be held shortly by the Manawatu Young Farmers' Club at Mr. E. W. Barnett's property at Halcombe.

Mammitis

Read what users say:

Kihi Kihi, 5th February, 1937.

Hamilton Vaccine Co., Ltd.,
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Dear Sir,—Re inoculation of cows for Mammitis. Since my last report to you on this matter, 8th March, 1930.

I have had both my herds inoculated each year with your vaccine. I have never known it to harm any cow, and the results have been very good. Considering the way cows are fed and bred for high production, one must expect some losses, but in my case losses from Mammitis have been light. Out of approximately 160 cows (both herds) I turned out:—

Season 1930/31—No losses.
" 1931/32—3 cows.
" 1932/33—1 cow.
" 1933/34—No cows.
" 1934/35—3 cows.
" 1935/36—4 cows.
" 1936/37—4 cows present season.

I am still certain that inoculation against this trouble is efficient, economical, and by far the best treatment I know of. But clean yards and sheds, well attended machines and careful milking must go with it to do any good."—Yours truly,

(Sgd.) J. G. SUTHERLAND.

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Poa Aquatica in June.

FOR more than one hundred years *Poa aquatica* has been known in England. It is stated in the Bath Agricultural Papers in 1816 that it is excellent fodder for milch cows, and that it yields 126,596 lb. of green feed per acre and 75,957 lb. when dried for hay. Recently attention has been drawn to this grass in Australia and New Zealand.

In New Zealand it will grow in swamps which are at periods flooded with water. It grows best where the swamp is kept moist throughout the year. In other words, it likes its feet in mud all the time. It reclaims swamps by overpowering and suppressing all rushes, flax, raupo, and other swamp vegetation. Blackberry-plants growing in swamps also succumb to its luxuriant upright growth.

Leafy Perennial Grass.

Poa aquatica is a leafy perennial grass growing up to 4 ft. in height, with its tall seed stalk up to 7 ft. or 8 ft. It is capable of living in very deep water, and can be seen growing in places covered with several feet of water in the driest of summers. It is estimated that it will grow in places which are flooded up to 6 ft. deep. It is palatable to stock, and has about the equivalent feeding-value of green maize. Since in tonnage per acre of green fodder it produces equally as much or more than maize, an established area of *Poa aquatica* can be considered a perennial green-maize crop.

Except where it is completely covered by winter floods, well-grazed *Poa aquatica* in the lower Waikato Basin does not cease growing throughout the year. Where it is understocked or ungrazed it will go to seed in the autumn, after which there is a period of dormancy, as there is in many grasses after seeding takes place. It recovers in June, when it again commences growth with increasing rapidity as the weather gets warmer, until, in the height of summer, grazed areas will grow at the rate of 1 ft. per week.

Wherever the grass colonizes it forms a raft of thick, intertwined rhyzomes, which will support heavy cattle in swamps where, before its establishment, they would be bogged or even drowned.

Method of Establishment.

Poa aquatica can be established by scattering seed over the swamps in the autumn and spring, or more surely by transplanting. Pukekos have the habit of pulling out the transplants, but this can be overcome by placing the plants more deeply and firmly in the soil. It will soon struggle through the tallest swamp growths, and its conspicuous flower heads are often the first indication of its coming mastery. *Poa aquatica* grows best in alluvial soils, and it is doubtful whether it can be established successfully on peat. It lives only in wet areas, and will not thrive for long on dry soils, so there is no danger of its invasion of ordinary pasture land.

Writing on *Poa aquatica* in Australia Mr. A. Graham Brown states: "This introduced perennial grass, which has valuable fodder properties, has found a most congenial new habitat in our swamps and morasses. Stock will graze it down to the mud or water level, and, cut on the green side, it makes good hay and ensilage. It can, of course, be grown under irrigation, and should be grown in seepages in irrigation districts and in low-lying places that are filled with water in winter and can be kept moist in summer by irrigation water."

—J. E. Bell, Instructor in Agriculture, Auckland.

Two fields of Poa aquatica in June. The far field is being grazed, while the near one is closed to stock, the grass being about 2 ft. high.

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Agricultural Exhibit at Whangarei Winter Show.

MORE than ordinary attention was attracted at the Whangarei Winter Show by the combined exhibit of the Soil Survey Division of the Department of Scientific and Industrial Research, the Department of Agriculture, and the Whangarei High School. The exhibit was designed primarily to deal with three problems—(1) the top-dressing of pasture land, (2) soil erosion, and (3) maize-growing on dairy-farms.

The soil map of Whangarei County, which was recently prepared by the Soil Survey, was displayed, and profiles of the chief soil types mapped were exhibited in long, shallow boxes. Each profile was scientifically classified, showing the relationship between one soil type and another as well as being labelled with the name commonly applied to it by the farmer. The results of top-dressing obtained from trial manurial plots were set out on labels above each profile, and the type of response was demonstrated by turfs from trial plots and farms.

Need for Lime Demonstrated.

The need for lime plus phosphates on all Northland soils, with the exception of the young, sandy soils of the coast, was clearly shown, as also was the benefit derived from the use of potash in conjunction with these manures in the volcanic brown loams and leached sand soils of the flats. Most farmers were able to recognize their soil from the soil profiles displayed, and only occasionally was it necessary to refer to the soil map.

Soil erosion was illustrated by photographs showing the changes which take place when the forest is replaced by pasture. The destruction of land by attempts to farm country too steep for permanent pasture, the loss of topsoil caused by frequent burning to control scant growth and pasture roughage, and the dangers of allowing hillsides to become eroded were also illustrated.

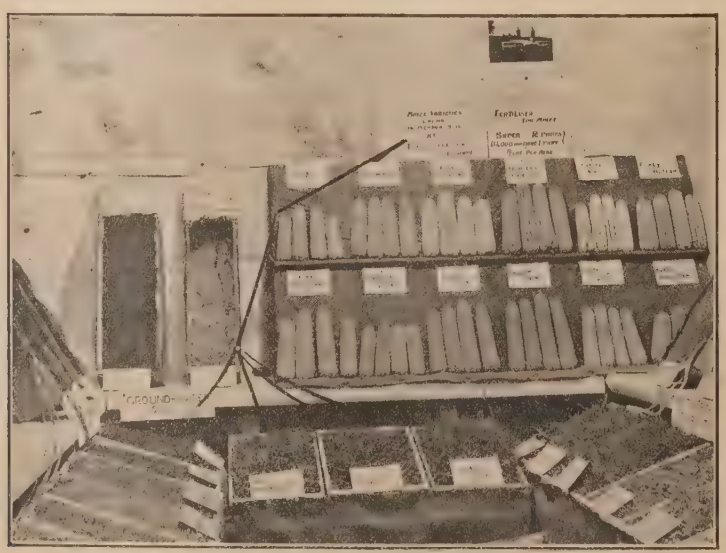
Soil Changes.

The various soil changes caused by different types of farming were demonstrated by sods placed on edge so that topsoil and subsoil could be seen. Much interest was displayed in the sod showing the soil under taraire forest as compared with sods under tight swards of browntop, danthonia, and paspalum, but most discussion centred round the photograph of a burned danthonia hillside and the sod showing the tufts of danthonia with the eroded bare patches between.

The maize varieties displayed were grown at Dargaville and Ruawai. A profile of the soil type on which they were grown, the manure used, and the results to date of the pig-feeding trials at the Dargaville Demonstration Farm, where maize-feeding of pigs is giving promising and payable results, formed an instructive exhibit, about which many questions were asked.

Although the entire exhibit was small, the appreciation of visitors left the impression that the effort was well worth while.

—E. B. Glanville, Instructor in Agriculture, Whangarei.



The agricultural exhibit at the Whangarei Winter Show.

(*Advertisement.*)

Inserted by the Biological Institute of Australasia and S. W. Peterson and Co., Ltd.—

ENTERO TOXAEMIA (PULPY KIDNEY).

There is no cure, preventive measures are imperative, and vaccination is the only course.

Where the disease is chiefly confined to lambs of very tender age the vaccination of the ewes a month or so prior to lambing is the line to take. Here the advantage of the single injection vaccine becomes outstanding, as this obviates a second handling of the sheep close to lambing-time. Dr. Bennet, in the *Australian Veterinary Journal*, shows that lambs can generally be protected for a few weeks following birth if the ewes are vaccinated prior to lambing. The immunity is not inherited—blood-tests prove this—but is transferred to the young ones in the colostrum or first milk when the lamb sucks. If the disease is confined to lambs of from one to three weeks there would appear to be no advantage in innoculating them also, at least until they themselves reach maturity and were in lamb. As experience, however, indicates that mortality from Pulpy Kidney is not confined to the very young lambs, but that lambs may die at any period after marking-time, in such cases the advisability of innoculating the lambs at marking-time is also indicated. Even the death of three or four lambs will involve a loss much greater than innoculating many hundreds; the insurance value of vaccinating alone makes this well worth while.

Experience indicates that if ewes are vaccinated with the BIO SINGLE INJECTION VACCINE shortly before lambing the lambs will generally be protected against the disease for the first few weeks of their lives, and if the lambs are given the BIO ONE INJECTION VACCINE when they are marked a very high degree of immunity against the disease will result.

Horticultural Instruction.

Contributed by Officers of the Horticultural Division.

Orchard Notes.

Preparation for Spring Work.

PRUNING operations, which have been the main activity in the orchards for several months of dormancy in fruit-trees, should be almost completed. If not, the work should be pushed forward with all possible speed so that the land may be cleared of all prunings and rubbish ready for the spring operations of cultivation and spraying, which should not be hampered in any way. The principal limiting factors in fruit-production are disease control and maintenance of soil moisture.

The major efforts throughout the whole growing season are directed towards securing adequate control of all pests and diseases affecting fruit-trees, and in providing good tilth for the preservation of moisture. Some preparation for this work is necessary, particularly in attention to machinery, if such has not been attended to already. It is most important that spraying equipment should be in good running-order, and nothing should be left to chance in spraying operations particularly, as a breakdown in equipment at such a critical time as the beginning of the season may prove to be a real disaster.

Disease Control.

For disease control the application of spraying specifics is, in the main, depended on, although other operations, such as pruning, fruit-thinning, drainage, and control of shelter-belts, all have a bearing on the incidence of disease. The general health of the tree should therefore be considered in connection with disease control. A tree weakened through overcropping, brought about by light pruning or lack of pruning, lack of general attention, poor drainage, and other causes, is more liable to suffer spray injury than a tree in a reasonably vigorous state.

Sprays recommended in these and subsequent notes are intended to apply under average conditions. Where trees are below par through any of the causes mentioned it may be necessary to so modify the recommended treatment as to render disease control less perfect. Efforts should be made, therefore, to bring about a desirable state of health in every tree by attention to these other essentials. Powdery-mildew, for instance, is often a result of general debility rather than a cause, and nothing but a re-invigorating of the tree by a harder and more detailed pruning, better cultivation, and attention to drainage will bring about the healthy condition necessary.

Success in Spraying.

Success in applying sprays for disease control depends on three important considerations—the time of application, the strength and suitability of the materials, and thoroughness in application. The times of application are regulated to a large extent by the stage of development in certain tree parts, such as the buds and the fruit. One should therefore study their development and be in readiness to apply a spray at the appropriate date. Materials are fairly well standardized, and by a system of certification growers are well protected in the purchase of materials. Certified products should be chosen for preference. Thoroughness in application is the *sine qua non* of spraying; every tree part must be thoroughly wetted.

The work is facilitated by the suitability of equipment, which should be adequate for the size of the orchard. Good spraying is more likely to be achieved where the pump is of sufficient capacity to give good volume delivery under good pressure, especially where trees are large, for otherwise the essential time required to wet every part thoroughly is not always given. Where pressure is low and the spray volume is poor, considerably more time must be taken over the work, as gallons per tree count considerably. Better work is done, with less liability to fruit and foliage injury, by using greater dilution of the materials and increasing the gallonage at each application.

Spraying Schedule.

For the control of scale insects and the minimizing of trouble from red mite early in the growing season, winter-oil at a strength of 1–20 may be necessary, depending entirely on the presence of such insects on the trees. Where San Jose scale is present a thorough application is very important. In the absence of any scale insects the use of winter-oil for red-mite control would depend entirely on the extent to which eggs have been deposited during the previous autumn.

Under average conditions a heavy deposit of red-mite eggs would cause a severe attack in the early summer months, when control measures cannot readily be adopted without interfering with the general programme of spraying for the control of fungous diseases. Winter-oil should be applied before there is any movement in fruit buds; otherwise damage may occur which will affect the fruit crop.

Control of Fungous Diseases.

The control of fungous diseases of both pip and stone fruits demands the attention of orchardists during the whole growing season, and success depends entirely on the earlier or foundation sprays, for which, as a first application, Bordeaux mixture 5–4–50, or lime-sulphur 1–30, are used according to kind and variety of fruits grown. Bordeaux mixture is the better fungicide, and may be regarded as a cleansing spray to be applied when the bud scales have lifted in order to destroy over-wintering spores, thus ensuring some immunity from attack. Subsequent applications of sulphur sprays will destroy spores from various sources which may alight on fruit and foliage. The fact that Bordeaux mixture, when applied later than the opening of fruit buds and during a period extending towards the time when fruit is almost full-grown, will cause a russet colouring of fruit precludes the use of this valuable fungicide, other than as a foundation spray, except for certain varieties of pairs the fruits of which are not so readily damaged by spray. Even so, sulphur sprays are preferable for the subsequent applications if quality and appearance of fruit is to be considered.

Manufacture of Mixture.

The particular period to apply Bordeaux mixture on apples and pears is at the "green-tip" stage of bud development. Control for leaf-curl of peaches is secured by a thorough application of Bordeaux mixture when the blossom buds are plump and before the terminal leaf buds break. Early blossoming varieties, such as Paragon, which are often sprayed at the same time as other varieties, have often advanced too far to secure satisfactory control of leaf-curl.

Bordeaux mixture 5–4–50 is prepared by using 5 lb. bluestone and 4 lb. hydrated lime of high purity to 50 gallons of water. The method of manufacture is to dissolve the bluestone and almost fully dilute with the bulk water to almost make up the required quantity of spray. The hydrated lime should then be made into a milk with a smaller quantity of water and poured into the bluestone solution while the agitator in the spray vat is running. Further water may then be added, if required, to bring up the quantity to the correct dilution.

The general programme of spraying to be followed will be discussed in the September issue of the *Journal*.

Cultivation.

Good cultivation has already been indicated as being very necessary for the conservation of moisture. If not already done, ploughing should be attended to as early as the land is workable, and the earth brought into a good tilth before dry conditions are likely to set in. A good tilth should be secured by the end of September.

Grafting.

Although grafting is done from about mid-September until mid-October, preparation should be made early by selecting scion-wood during pruning and keeping it fresh by "heeling in" in a cool place, just sufficiently moist, but not wet. Scions should be quite sappy, but not too forward.

Where trees intended to be reworked have a good framework, consideration may be given to the method of refurnishing to change the variety, rather than dehead and regraft by the usual methods of rind-grafting into the remaining stumps. In the refurnishing method the framework is skeletonized and scions are worked on to laterals cut back to stubs, and additional scions are inserted into the bark of the main limbs.

Fruit in Cool Store.

Fruit in the cool store should be examined frequently for condition. This applies particularly to pears and large sizes in Sturmers, which should be marketed early if showing signs of maturing.

—N. J. Adamson, Orchard Instructor, Hastings.

Citrus Notes.

The Young and the Old Orchard.

In the young orchard not yet in bearing the most important work for August is pruning. The first five years in the life of the young citrus tree are the most important, and a personal examination of each tree in the orchard and careful pruning is essential. No two trees are alike, and few rigid systems are of real value. Trees are living identities, and must be treated as such. The good orchardist prunes to produce a strong, well-balanced tree and good-quality fruit in a reasonable quantity for the size of the tree.

The first few years, however, should be devoted to tree-development rather than to early fruit-production. To obtain good quality the fruit must be free from disease, and to control disease the tree must be sufficiently open to enable sprays to penetrate. It will be surprising, too, the number and varieties of diseases present in a young orchard which will be revealed during the pruning recommended for August. By pruning at this time all the young spring growth will be thrown into the limbs, in which it will be of use to the tree. Be sure to burn all prunings as soon as possible and to retain the best hygienic conditions in the orchard.

Cultivation.

Cultivation by ploughing in the cover-crop or heavy disking should be started this month if conditions are favourable. Do not attempt to cultivate too deeply close up to the trees. It is better to work the soil by hand, each year widening the circle worked around the tree. If the tree has been correctly planted, cultivation can be done to a depth of 4 in. to 6 in. right up to the trunk of the tree. Cultivation is done for the aeration of the soil to improve fertility and soil conditions for the tree. Do not allow the cultivation to rank as more important than the tree, with the result of damaged limbs or broken bark.

Manuring will be necessary when spring growth commences, and it will be advisable to have the required quantities ordered and on hand. It is difficult to give definite advice on manuring, but a few general principles will help. If your young grove is costing you more than you expected, remember that the micro-organisms of the soil (the nitrifying bacteria) are there to help you if you will assist by giving them the necessary living-conditions.

A well-aerated soil and sunlight are what they need. They will not tolerate an acid or sour soil, so that if artificial fertilizers cannot be applied the soil should be limed and as much green vegetation, such as weeds, as possible should be turned in. The soil has often

been thought of in terms of minerals and chemical manures. It is, however, necessary to think of it also in terms of microbiology to manage it properly.

The Established Orchard.

Probably this will be the last month for heavy pickings of lemons. With the heavier quantities it is more important than ever to pick only preferred sizes—180 to 252 counts to the bushel case if for culinary purposes, and 125 and larger good, clean, yellow fruit if for peel. Whatever happens, do not neglect regular picking if the orchard is not to suffer for the next year or two. Even if prices appear unpayable it is advisable to remove the fruit from the trees; otherwise the orchard will be heavily handicapped, and when prices rise there will be a small "fruit harvest" on the unpicked orchard. The efficient citrus grower will pick every three or four weeks whatever the market prices are. After the fruit has been picked is the time to decide how much inferior fruit should be buried on the orchard, but it should not be allowed to remain on the tree.

As soon as picking is over it is wise to give the trees a good pruning overhaul, and if this is done disease control next summer will be much easier. Order your requirements for spring manuring, and judge your quantities according to the fruit yields obtained. An overhaul of cultivation implements on a wet day will save time in the fine weather. Consider whether your orchard justifies its own spray equipment or whether you can make a better arrangement than last season's before next spraying season commences.

New Zealand Grapefruit.

New Zealand grapefruit should not appear on the market for dessert purposes this season earlier than this month. Practically all fruit sold under this name prior to August will be doing a disservice to the very fine fruit that can be marketed for dessert purposes under this name. All fruit sold earlier should be branded "Poorman oranges" or "marmalade oranges."

Sweet Oranges.

The Washington navel crop should be ready to market this month. It is all-important to place the fruit on the market in a mature condition if it is desired to capture the New Zealand market, which has been served with imported fruit with a good sugar content. It is folly to market sweet oranges too early; cut a few fruit and be satisfied yourself that the fruit is sweet.

—L. Paynter, Orchard Instructor, Auckland.

Tobacco Notes.

Seed-sowing and Preparation of Beds.

THE last week of July and first week of August is the best time for sowing commercial tobacco in New Zealand, and because of the uncertainty of weather conditions this should be done in a glasshouse with controlled heat and ventilation. The seed should be sown in boxes 10 in. by 14 in. with a 3 in. depth of wall containing 2 in. of fine, sifted soil pressed firmly smooth and level.

The amount of seed used for each box can be accurately measured by using a long ·22 calibre copper cartridge case. This container will hold an average of 2,000 seeds. I find a useful sprinkler can be made with a small bottle. Pierce the lid from the inside with a fruit-case nail, making one hole. Pour in the measure of seed, and sprinkle over the box lengthwise and crossways until all the seed has been used. This ensures a slow bud and perfect distribution of the seed. Then press the surface with a sheet of glass which has had a thin leather or calico handle fastened, as a loop, with secotine. The glass prevents soil adhering to the pressure surface, and embeds the seed. A sifting of fine silver sand completes the process.

Sown boxes should be covered with a sheet of newspaper to exclude the light until germination takes place, but care must be exercised that it is not left on later, as the seedlings will stand up with long delicate white stems and be quite useless.

Supply of Seedlings.

In the Nelson District all the commercial growers receive their supplies of tobacco-seedlings from the professional nurserymen, who produce them under contract to the manufacturing tobacco companies. These nurserymen receive payment from the companies, who, at the end of the season, charge the amount to the growers, deducting the value from payment for tobacco-leaf delivered under contract. This method of glasshouse-raising of seedlings by nurserymen, and the pricking-out of the seedlings by the growers into nursery beds, was inaugurated by the Department of Agriculture in 1926, and has been universally practised in Nelson ever since.

Tobacco-plants produced from imported seed are neither as vigorous nor as hardy as those which are produced from seed saved from acclimatized plants, but unless the greatest care in selection of the suitable parent plants and elimination of the undesirable pods on the seed-head is exercised the locally raised seed very quickly deteriorates and the desirable characteristics of the imported variety are lost.

A normal seed-head has approximately 280 pods, containing more than 1,500 seeds, but of these only about 30 are worth saving, and these have to be carefully selected and kept covered from birds and mice. Constant pruning out of later growths must be made until the chosen pods have ripened. This entails a great deal of careful work, and explains why certified tobacco-seed is worth 5s. per ounce when ordinary seed saved by farmers could be used at a cost of 1s. per pound, using the whole seed-head (if there was a sale for it).

Maintaining the Virtues.

By saving the few correct pods from perfect plants it is possible to maintain the virtues and, by acclimatization, possibly to improve upon the imported seed obtained from America. One firm in the United States of America has built up its reputation by the careful selection and treatment of tobacco-seed productions, and it commands $1 per ounce. The indiscriminate importation of tobacco-seed by seed-merchants is a source of danger to the tobacco industry of New Zealand, as many diseases may be introduced from overseas.

Some tobacco-producing countries zealously guard their industry by prohibiting the importation of tobacco-seed. In Havannah it is an offence, with heavy

fines and imprisonment. In certain European districts, such as Kavaka and Latakia, the strain of tobacco-seed has been kept pure by exclusion of imported seed for many generations, and it was only during the Great War, in 1916, that some of the most exclusive strains became distributed.

Seasonal Work.

Growers in this district are now preparing their lands for the coming season by ploughing and liming. The tobacco-plant absorbs a considerable quantity of lime, and when this is available in a soluble form at planting-time there is very little danger of angular spot disease. A paucity of lime is indicated by dead tissue showing brown spots the size of a threepenny piece upon the leaves.

—*Charles Lowe, Tobacco Instructor, Motueka.*

Cool Storage Notes.

Hints for Cool-store Owners.

PEARS should be carefully inspected and sorted if any signs of injury rots are showing up, as contact will bring about nesting and loss if sorting is neglected. If Granny Smith apples have been picked early and placed in the cool store immediately, they can be tested for immature discoloration by taking a few apples from the cool chamber and placing them in a convenient place for inspection. If discoloration from immaturity develops, this line should be placed on the nearest market to avoid delay in reaching the consumer. When this fruit is allowed to remain in the cool store the discoloration develops more quickly as the season progresses, and, on reaching the market, is unfit for sale.

Any fruit that has broken down should on no account be left in the cool chambers, as it is creating gases that are injurious to the fruit in the store. A few steel drums should be placed in a convenient position near the packing-bench for waste fruit, and should be emptied regularly each week.

Hints for Private Cool-store Owners.

Never take a risk when breaking an ammonia joint or when packing a valve spindle. If ammonia liquid reaches the eyes it will cause total blindness, especially if oil is mixed with the liquid ammonia, as it cannot then be diluted with water.

At regular intervals pump out the expansion coils, and when the machine is hot remove the oil from the oil trap. This will free the ammonia system from excess oil and increase the efficiency of the ammonia. Weak ammonia liquor may also be drawn from the system in this manner. If litmus paper is not available, a little powdered sulphur put in a spoon and set alight will assist in detecting a small ammonia leak.

The gland and bearings of the condenser pump should be given close attention at regular intervals, and a yearly overhaul is essential to obtain smooth, trouble-free running of the plant throughout the year. When in doubt, send for your refrigerating engineer. This will tend to avoid accidents and delays, and will keep the plant always in good running order.

—*A. Powell, Cool Storage Officer, Wellington.*

Fruit in Cool and Ordinary Storage.

THE following is the estimated quantity of apples and pears held in cool stores and in ordinary storage (other than recognized cool stores) at 30th June, 1938 :—

	Apples. (Cases.)	Pears. (Cases.)
Auckland—		
In cool storage ..	135,147	21,705
In ordinary storage	2,000	..
Hamilton—		
In cool storage ..	2,400	100
In ordinary storage	600	..
Tauranga—		
In cool storage ..	..	..
In ordinary storage	1,115	..
Gisborne—		
In cool storage ..	12,398	779
In ordinary storage	5,800	..
Hastings—		
In cool storage ..	119,800	26,400
In ordinary storage	40,000	..
Palmerston North—		
In cool storage ..	488	..
In ordinary storage	3,855	..
Masterton—		
In cool storage ..	8,000	..
In ordinary storage	3,000	1,000
Wellington—		
In cool storage ..	62,254	11,304
In ordinary storage	..	..
Nelson—		
In cool storage ..	23,180	3,940
In ordinary storage	9,500	..
Nelson Central		
In cool storage ..	..	..
In ordinary storage	9,250	..
Motueka—		
In cool storage ..	31,900	7,800
In ordinary storage	13,000	..
Blenheim—		
In cool storage ..	..	..
In ordinary storage	2,490	..
Christchurch—		
In cool storage ..	56,293	8,058
In ordinary storage	30,000	1,000
Dunedin—		
In cool storage ..	2,202	535
In ordinary storage	12,000	700
Alexandra—		
In cool storage ..	..	..
In ordinary storage	22,000	180
	608,672	83,501
Total in cool stores	454,062	80,621
Total in ordinary storage ..	154,610	2,880
	608,672	83,501

Vegetables, Small Fruits, and Flowers.

Contributed by the Horticultural Division.

General Notes for the Garden.

The Tomato Crop.

In planting out the tomato crop in the unheated glasshouse one of the important points to observe is the thorough watering of the plants on the day before removal, using tepid water at a temperature of about 60° F. Experiments have demonstrated that the wider spacing of the plants when setting them out yields a crop at least equal to that which is planted closer. It is also safe to state that the plants are more easily managed, and there is less trouble and anxiety through the attacks of disease. Twelve inches between plants and 30 in. between rows admits more sunlight and permits better circulation of air and more room for working than the closer spacing which is very commonly practised.

The plants should be set rather deeper than they grew previously, but the extra filling should not be done until the plant is established and acclimatized. Soil and subsoil should be thoroughly watered a few weeks before planting so that it can heat up again before that operation; the plants will then not require to be watered in. Watering will not be required until growth commences. Water should be applied only when necessary, using tepid water, but little should be required before the fruit has set and warm weather can be relied on.

Planting in Warm Intervals.

Planting should be done during a warm interval, keeping the doors shut as much as possible to avoid chilling the plants, and the house should be kept rather close for a week after planting. Moderate ventilation should then be given at every opportunity, carefully avoiding cold draughts and maintaining a minimum of 55° F. at night.

As soon as germination has taken place seeds recently sown to raise plants for planting outside towards the end of October and beginning of November should be given air on all suitable occasions. Neglect in this respect is a common cause of trouble. Only after pricking out should they be kept rather close for a few days; at all other times admit air when temperatures permit. Produce sturdy plants which are well rooted. Give tepid water as required, but little will be necessary if the compost is right and the boxes are on a hot bed.

Asparagus and Rhubarb.

These useful culinary plants are perennials which are productive for a number of years before replanting is necessary. The former is exceptional in that under good conditions it remains profitable for a period of ten to twenty years. The latter, on the other hand, requires replanting on fresh land at intervals of three to four years. For the best results each demands generous manurial treatment in the preparation of the ground both before planting and afterwards.

The manurial treatment of established crops of asparagus vary rather widely, according to circumstances, but applications are made mostly at the conclusion of the cutting season—early in December—and during the spring shortly before and after growth commences. The crop is partial to nitrogen, potash, and lime. It is also important, as with most herbaceous crops, to maintain an adequate supply of humus.

Manurial Dressings.

At this season a dressing per acre of 6 cwt. basic superphosphate and 2 cwt. muriate of potash or 3 cwt. potash manure 30 per cent. will be a suitable dressing followed up early in September with a dressing of 2 cwt. nitrate of soda per acre, repeated as necessary at intervals of three or four weeks. In the rare occasions where the crop is growing in a soil which is inclined to be heavy, sulphate of ammonia should be used in the place of the nitrate.

Rhubarb is given this attention at somewhat similar periods. A dressing of 5 cwt. superphosphate and 1½ cwt. sulphate of potash per acre may be worked in now and 2 cwt. sulphate of ammonia when pulling commences, followed by a rather larger dressing of the same as soon as pulling is completed for the season. After the first dressing mentioned some growers find it advantageous to spread a dressing of long, strawy stable manure, when available, as it has a tendency to encourage early growth.

September-sown Crops.

Important plantings during September are main-crop potatoes, sea-kale, cabbage, and cauliflower, sowings of salads, spinach, parsley and peas, short carrots and globe beetroot, and towards the end of the month, celery, leeks, brussels sprouts, and in the warmer localities, dwarf beans. Some of the important points to be observed here are to plant only Government-certified seed potatoes, more especially in the warmer districts; in such localities good crops are rarely obtained from any other stocks. Another point is to sow seeds thinly. It is with the finer seeds that mistakes are chiefly made. Celery, lettuce, carrot, and cabbage seeds are very commonly sown much too thick, which is a waste of seed, increases labour, and depreciates the crop. Therefore, sow thinly and avoid the labour

of thinning out. If you are doubtful regarding the germination of the seeds, have them tested.

The White Butterfly.

The white butterfly emerges first during August, and by the middle of September it is usually fairly numerous. While a solution of arsenate of lead will protect crops from the attack of this, and any other caterpillar larvæ, that spray is unsuitable for application to cabbage and salad crops. For these a good brand of derris powder should be used; it is quite as effective and is non-poisonous.

If the powder is stored in a dry place and kept tightly covered it will retain its essential qualities, and better and more economical distribution will be obtained. The dust should be applied during windless periods in the early morning or late afternoon. A thin, even application is required. It is a considerable deterrent for aphis and other sucking insects, and experience indicates that good control of slugs may be expected from its use.

Small and Sundry Fruits.

Work under this heading during September consists of completing the planting of new areas and the cultivation and spraying of established crops. It is of importance that the cultivation should be shallow so that roots are not disturbed.

Shallow ploughing is sometimes done in late autumn and during the winter, and it is satisfactory where it has been the regular practice, but any disturbance of the roots now will seriously injure the crop.

Manures and Fertilizers.

Manures and fertilizers are usually prescribed in terms of tons or hundredweights per acre, and the use of such prescriptions in actual practice is a comparatively simple matter. In scientific experiments, where comparisons have to be made on an equal basis and more exact information is sought, the various dressings are prescribed in a way which ensures that each plot is given an equal amount of the three principal elements which are used extensively by crops, and of which there is often a shortage in the land.

This was illustrated in the notes last month on experiments carried out in manuring raspberries, in which nitrogen (N) was used in all plots at the rate of 50 lb. actual nitrogen per acre, phosphates at 120 lb. (approximately 60 lb. phosphoric acid (P_2O_5)), and potash (K_2O) at 100 lb. actual potash per acre. The system is commendable in that it is more exact and often more economical than others. It is also comparatively simple so long as the amount of the elements referred to as present in the fertilizer is known.

Table of Analysis.

Buyers of 5 cwt. or more of any particular fertilizer are supplied with an analysis. In its absence the following table will afford a useful indication of what may be expected :—

Fertilizer.	Nitrogen (per Cent.)	Phosphoric Acid (per Cent.)	Potash (per Cent.).
Dried blood ..	12 to 14	..	
Bone-dust	2 to 4	17 to 27	
Nitrate of soda ..	15	..	
Sulphate of ammonia	20	..	
Superphosphate ..	..	20 to 22	
Basic superphosphate	..	16 to 19	
Basic slag ..	..	14 to 17	..
Sulphate of potash ..	..	..	48
Muriate of potash ..	..	..	50

Some confusion sometimes arises in quoting ammonia in the place of nitrogen, phosphates in the place of phosphoric

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acid, and sulphate of potash in the place of actual potash, potassic oxide. Conversion tables will be found in any good authoritative work on the subject. The essential elements—nitrogen, phosphoric acid, and potash—are sometimes more briefly referred to under the symbols of N.P.K. (Kalium).

Complete mixed fertilizers are sometimes quoted as 4-8-10 or 5-12-5, &c., the figures having reference to the percentage of N.P.K. in the mixture. For instance, a 4-8-10 mixture should contain 4 per cent. nitrogen, 8 per cent. phosphoric acid, and 10 per cent. actual potash. Where any particular mixture of this class is recommended for a crop the advice is incomplete unless the quantity to be applied per acre is also given. It should also be remembered that as regards insoluble fertilizers, such as bone-dust, basic slag, &c., the rapidity of their action depends on the fineness of the grinding.

The Planting Season.

To ensure that full advantage of the coming growing season is secured, the planting of hardwood plants should be completed during September, which, under most conditions, terminates the period of the present planting season.

A recent exchange from South Africa, in an article dealing with shelter-belts in country subject to frosts sufficiently hard to make the establishment of eucalyptus somewhat difficult, and subject to periods of severe drought, recommended planting the margins with *Pinus halpensis, Cupressus arizonica, Cupressus torulosa, Cedrus deodara,* or *Juniperus virginiana,* especially for affording a substantial measure of protection from frost. It is recommended they be planted 12 ft. to 20 ft. from the gums and 12 ft. to 18 ft. apart to retain the basal foliage, and if two rows of conifers are planted they should be alternate, with 15 ft. between the rows.

While such a recommendation can only be accepted here with caution, it is of interest to those who frequently have to contend with conditions of frost and drought. A recent article in the *Journal* gave strong support to the consideration of planting *Cupressus arizonica* in dry areas here, and the other trees mentioned above, with the exception, perhaps, of *Pinus halpensis,* may be readily obtained for trial purposes in positions where they are not already established and where opportunities are afforded for studying their behaviour under extreme conditions.

The Homestead Garden.

Seasonable work in the home garden includes sowing hardy annuals. Sweet peas, mignonette, nasturtiums, &c., have an ornamental value comparable with anything which may be planted if a suitable situation is chosen. In boxes under glass half-hardy annuals may be sown and pricked out later for planting out when comparatively frost-free weather can be relied on.

In beds reasonably enriched with decayed farm manure and bone-dust a bright display can be obtained with comparatively little labour if the arrangement is a simple one. House plants in pots and hanging baskets may be repotted as required. They should be thoroughly watered a few days before the operation and afterwards very sparingly until new growth has commenced.

New lawns may be laid, with excellent prospects in the more humid districts, but in the drier areas the work should be expedited. At this season established lawns may usually be given with advantage a dressing of a mixture of three parts superphosphate, four parts sulphate of ammonia, and one part finely-ground sulphate of iron, applying it evenly at the rate of 1½ oz. per square yard. It should be thoroughly mixed with a little fine soil or sand to facilitate even distribution.

—*Wm. C. Hyde, Horticulturist.*

Farmers!

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Work for the Month in the Apiary.

Care During the Spring Months.

WITH the advent of August colonies in a normal condition should have a good quantity of sealed brood. If, however, the absence of brood is noted the indications point to a poor queen or a queenless hive. To attempt to carry such colonies through the spring months will lead to serious trouble, as they stand in danger of being robbed out. It is a far better plan to unite such colonies than to run the risk of disturbing the whole apiary.

A simple method of disposing of weak and queenless hives is to unite them with strong ones, and this may be carried out by placing a sheet of newspaper over a strong colony and putting the hive to be united on the top of the paper. In the course of a day or two the hive may be examined to see whether the colonies have united. Should the paper be intact, it must be torn in several places, when it will be found in the course of a few days that the colonies are working peaceably.

It is essential that breeding should be kept going steadily so that the colonies will be strong in young bees to take advantage of the first flow of nectar. Food and warmth are important factors in inducing breeding, and these must have the constant attention of the beekeeper during the spring months.

Food-supply.

The spring is the most critical period of the year for the beekeeper, and the success or otherwise of the season's work will depend almost entirely upon his efforts to guard against the losses attendant upon starvation. Large losses occur annually through neglect in this direction. When breeding is in full swing a considerable amount of food is used up daily for feeding the brood, and, unless the weather conditions are favourable to enable the bees to work the early spring blossoms, it is essential that the food-supply be augmented. The amount of nectar gathered when the weather is favourable in conjunction with their stores will tide the bees over long periods, but if bad weather follows colonies will often be reduced to a state of starvation before the owner is aware of their condition. If on examination a colony is found with insufficient stores to meet requirements, preparation should be made to feed at once. It is not a safe policy to keep a colony at starvation-point, as this will prevent the rearing of a succession of young bees to take the place of the rapidly dwindling number of workers at this period.

There are many feeders on the market which can be utilized for supplying food. The division-board feeder is the best to use at this season, as it will serve the double purpose of feeder and division-board in cases where the colony is not strong enough to occupy all the frames in the hive. When making an examination of a hive to note its condition the beekeeper should place the feeder in the hive in readiness if it is anticipated that artificial feeding will have to be resorted to at a later period.

Position of the Feeder.

All feeding should be carried on within the hives, and precautions should be taken against feeding at the entrances, as this practice will surely give rise to trouble. Place the feeder on the warm side of the hive, and in cases where the clusters are small the feeder may be inserted in position next to the cluster.

A point to remember in connection with feeding is that it creates an artificial flow and is stimulating, and, when started, it must be carried on until a natural flow from the field sets in. If there is a suspicion of disease in the apiary no attempt should be made to feed honey. In any case, it is not wise to use honey taken from another hive, as it is impossible to be sure of its source. Feed only the best white sugar.

It is a good plan to feed in the evening, as the discovery of the syrup excites the bees and the colony has time to settle down before the morning, and there is also less likehood of the other colonies learning the cause of the excitement. A syrup composed of two parts of water to one of sugar, fed slightly warm, will prove the best artificial food for bees in the spring.

Overhauling the Hives.

Advantage may be taken of the mild, spring days to subject the hive to a thorough overhaul. Where necessary, each hive should be given a good coat of paint. The bottom-board should be cleansed by removing the cappings, dead bees, and pollen. If left, this matter becomes very objectionable, and acts as a harbour for insects. In districts where the bees bring in quantities of propolis it is advisable to remove this also, as it prevents to some extent a rapid manipulation of the frames. The propolis is brittle in the spring and can be readily removed.

The operation of cleaning the bottom-board can be facilitated by providing a spare. Lift the hive on to the spare board, scrape the dirty one thoroughly, and replace the hive. All weeds and long grass must be cleaned from the hives. They act as a harbour for insects and keep the bottom-boards damp, in addition to preventing the bees from flying freely to and from the hives.

Robbing.

Every precaution must be taken to prevent robbing from getting a start in the apiary. Robbing may be caused by exposing combs too long when manipulating the hives, by careless feeding, and by the presence of weak and queenless colonies. These colonies should not be tolerated, and the other causes can be obviated by care and attention. On no account should combs be exposed for long intervals, and if feeding has to be undertaken it should be deferred until late in the day. The excitement caused by feeding attracts others, and once they have tasted of the forbidden sweets they will continue to molest the hives for many days. As soon as robbing is detected it is by far the best plan to postpone all operations in the apiary, and the entrances to the hives should be contracted at once.

If a colony is in danger of being robbed it may be saved by piling wet grass in front of the entrance. Robbers are less likely to enter a hive so protected. Very little trouble, however, will be experienced by robbing if it is not allowed to get a start. Prevention is the best plan in all cases. On no account spill syrup near the hives, do not leave combs lying about, and try and avoid weak and queenless colonies. If this is done there will be no trouble with robbing.

Disease.

At each examination a strict watch must be kept for symptoms of disease. If it is present, do not fail to mark colonies for treament. Mild cases can be treated at a later period in the season, but if a colony is badly affected it is the safest plan to sulphur the bees and remove the combs to a place of safety. These combs can be converted into wax when a sufficient number warrant the undertaking.

If isolated capped cells are discovered they should be treated as suspicious. Healthy brood-cells are convex in form, bright in appearance, and in contrast differ greatly from diseased cells; the latter are slightly darker, concave in form, and are frequently perforated. Diseased cells of last season's production are usually so shrunken in appearance as to be easily detected, whether they are in isolated positions or surrounded by healthy brood.

—E. A. Earp, Senior Apiary Instructor, Wellington.

Honey-Producing Plants of Westland, Marlborough, and Nelson.

Westland.

IT is doubtful whether there is any other part of New Zealand with as wide a variety of honey-producing plants as is found in the provinces of Westland, Marlborough, and Nelson.

In Westland the bees obtain very little honey from anything other than native trees and plants, and these are so numerous that it is only possible in a short article to touch on some of the more commonly known varieties. Much of the nectar is gathered at seasons when the need of it in the hives prevents its being found in recognizable quantities in surplus honey. Such honey-flows, however, play an extremely important part in the life of a colony of bees, and may be indirectly responsible in the production of a surplus crop in due season.

The earliest source of nectar is what is commonly known in this district as "Fivefinger" (*Nothopanax Colensoi*), flowering from July to October. The bees work this freely when conditions permit. Another very early flowering plant from which the bees forage nectar is rangiora (*Brachyglottis repanda*), flowering in August and September. Its principal concentration is on the limestone hills at Greymouth and also at Barrytown; to my knowledge there is none south of the Grey River. The honey from this source has never been found in recognizable quantities in surplus honey.

Gorse Worked Freely.

In some seasons gorse (*Ulex europoeus*) is worked quite freely by the bees and honey is stored in noticeable quantity, the hives registering an increase in weight. Following and coincident with gorse is the well-known kowhai (*Sophora tetraptera*). This tree is found in all parts of Westland, but is more common in the nothern end at Westport. It is very much in evidence at Murchison, up the Buller River, and at Inangahua. A very heavy flow, but of comparatively short duration, is obtained from this source.

The bush-lawyer (*Rubus australis*), a climbing bramble which is found extensively all through the bush, has a flowering season from September to December, and in Westland the bees work it quite extensively during September and October. A very important spring-flowering tree is the fuchsia, or kotukutuku (*Fuchsia excorticata*). This is very widespread throughout the province, and has a long flowering season from August to December, but very little nectar is obtained from this source before September, when it secretes nectar profusely.

Areas of Flax.

All through Westland there are comparatively large areas of New Zealand flax (*Phormium tenax*). It is rare, however, to see much honey from this source appearing in surplus honey. Honey produced at Barrytown in some years is an exception in this, when the nectar darkens the honey and imparts its characteristic flavour. With the extensive distribution of blackberry (*Rubus fruiticosus*) in Westland one would expect to find very much more honey obtained from this source than is the case. It is exceptional to be able to recognize its presence in surplus honey, but in some seasons I have observed the bees working it extensively during a very short period.

The wineberry (*Aristotelia serrata*) is found throughout Westland, and usually occupies areas from which the bush has been cleared. It is not prolific in its secretion of nectar, but in some years the bees make very good use of this source. One of the most prolific sources of nectar in Westland is the kamahi (*Weinmannia racemosa*), which is widely distributed and flowers during November and December. The honey is light amber, with a characteristic and strong flavour.

Beech Family.

Of the beech family there are the red-beech (*Nothofagus fusca*) the silver-beech (*N. Menziesii*), the black-beech (*N. Solandri*), and in the higher country the mountain-beech (*N. cliffortioides*). These trees are worked by the bees principally during November. The honey is strong in flavour, although light in colour. The two species of the scarlet mistletoe (*Elytranthi Colensoi* and *Elytranthi tetrapetala*) are well distributed through the bush. They are parasitic principally on *Nothofagus solandri*. The bees work this source for nectar during December and January, and only in occasional seasons is there sufficient in surplus honey to detect its presence by taste. Isolated specimens of the inaina, or mahoe (*Melicytus ramiflorus*), are found in all parts of Westland. It secretes nectar profusely, and is freely worked by the bees.

The most important source of nectar to Westland beekeepers, although not the most consistent, is the rata (*Metrosideros lucida*). This commences flowering on the coast in December, while in the mountainous country it may be as late as April before it ceases. The greatest benefit from this source is usually obtained by the bees during January and February. The rata vine (*M. perforata*) is in evidence in the bush in most seasons of the year. It is a useful source of nectar, but never gives a flow comparable to *Metrosideros lucida*. Another of this family found in this district is the white rata shrub (*M. florida*), which is worked freely by the bees. It is well distributed throughout the bush, but there is insufficient to play an important part in the production of a crop.

There are two members of the ribbonwood family worked by the bees in Westland—*Hoheria augustifolia* and the mountain-ribbonwood (*H. Lyallii*). Both flower in the autumn (February to March) and later. They are an important factor in providing a fall flow to the bees.

Presence of Ragwort.

The presence of ragwort (*Senecio jacoboea*) and the advance it is making in Westland is a matter of concern to

beekeepers and dairy-farmers alike. Its flowering in the higher country coincides with that of rata, and if the latter is flowering and is accessible the bees will not work the ragwort to any extent, but as rata is not consistent in flowering, in its off-season the bees work the ragwort extensively, and evidence of this can be readily detected in the honey extracted at the close of the season.

All through the bush there is a large variety of koromiko or veronica (*Hebe genus*). The different varieties produce blue, purple, and white flowers which are worked freely by bees, and in some seasons they play a large part in the production of honey in Westland.

Among the pasture plants in Westland there is no other playing as important a part in honey production as *Lotus major* (order *leguminocae*). The climatic conditions in this district are particularly suitable to the establishment of *Lotus major*, and it is spreading rapidly in all pastures. Its principal flowering months are January and February. In off-seasons for the rata fair crops can be harvested from this source, and it is becoming increasingly important as the bush recedes and pastures and secondary growth take its place.

Disquieting Feature.

The suitability of the climatic conditions of Westland to the establishment of pennyroyal (*Mentha pulegium*) is disquieting, although there is not very much in evidence at present. It has made considerable progress at Inangahua, and I have detected it in a pronounced form in the honey of that district.

One of the principal difficulties faced by the beekeepers depending on the native bush as the source of nectar is the irregularity and inconsistency of the flowering of most of the native plants. In some years it will be difficult to find any rata in bloom, and in such a year crops in Westland are likely to be below the average, but there is such a variety of plants for bees to work that it is exceptional to have a year in which a fair crop cannot be obtained.

Marlborough and Nelson.

In Marlborough and Nelson the climatic conditions are totally different from those experienced in Westland, and although much of the honey of Nelson is produced from the nectar of native plants it is very different in character from that produced in Westland. In Marlborough only a small proportion of the honey produced has the bush as its source, the bulk coming from the Marlborough Plains, which are devoted largely to seed-production, sheep-farming, and dairying.

In the Marlborough Province quite a heavy flow is sometimes obtained from the willow in September and October. On a few exceptional occasions this flow has been so heavy as to warrant some of the honey being extracted, but this honey is of little value for human consumption, and its principal advantage is in replenishing the depleted winter stores of the bees.

In the Nelson Province and in the fruit-growing areas of the Marlborough Province the apple, pear, and stone-fruit blossom provide a very valuable source of nectar in the spring, which follows the flow from the willow. In Nelson much of this honey is removed in the crop. In those areas where bees have access to the bush they will find sources of nectar similar to most of the bush plants of Westland, but around the Marlborough Sounds lemonwood (*Pittosporum Eugenioides*) is very much in evidence, and the bees work it freely.

Eucalypts used Extensively.

The eucalypts are used extensively in both the Nelson and Marlborough Provinces in shelter-belts, for which purpose the blue-gum (*E. globulus*) seems to be the most favoured.

In districts of both the Nelson and Marlborough Provinces there is a honey-dew obtained by the bees from an aphid working on the red-beech (*Nothofagus fusca*). This honey-dew, in common with nearly all honey-dews, is very dark, with a strong and unpleasant flavour, and if mixed with otherwise palatable honeys will seriously detract from their value. This honey-dew, which is foraged by the fees principally in the spring and the autumn, is obtained in large quantities, but is more of a menace than an advantage to the beekeepers.

The manuka (*Leptospermum scoparium*) is responsible for influencing practically all the honey produced in the Nelson Province; as it is difficult to extract, beekeepers confine themselves largely to the production of comb honey in Nelson. Barberry (*Burberis vulgaris*) is a hedge-plant popularly in use in Marlborough and Nelson, and in most seasons provides a valuable source of nectar as well as pollen in the spring. Very little of the honey produced from this source finds its way into the surplus honey removed.

Flax in Marlborough.

Although much of the New Zealand flax (*Phormium tenax*) has been cut out in Marlborough, there are still areas distributed throughout the district. In a few particularly dry seasons flax has been the only source of nectar worked by the bees in some of those districts. However, the average quantity of honey produced from this source is comparatively small.

White clover (*Trefolium repens*) is well distributed throughout the Marlborough and Nelson Provinces. In Marlborough it is the principal source of nectar, and is responsible for producing a very fine grade of honey which, but for the consistently dry seasons experienced in that province, would be produced in large quantities. Catsear (*Hypochaeris radicata*) is well distributed through both provinces, and with it other similar weeds. Hawkbit (*Leontodon hispidus*), hawkweed (*Crepis capillaris*), capeweed (*Cryptoctemma calendulacea*), and dandelion (*Taraxacum officinale*) all produce a similar honey, which has a greater influence on the honey produced in Nelson than that produced in Marlborough.

Lucerne Important.

In some of the seed-growing areas in Marlborough, lucerne (*Medicago sativa*) is the most important honey-producing plant, in spite of the fact that the honey-bee is not the most adequately equipped insect for the work of pollination of lucerne. However, by reason of their greater concentration they become the principal pollinating agents in this work. Lucerne produces a very good grade white, mild-flavoured honey which is in popular demand.

In most districts of the Marlborough Province, and to a less degree in the Nelson Province vipers bugloss (*Echium vulgare*) is well established. This is a weed which will flourish in a dry area, in river-beds, and along the roadsides. It is a serious menace in pastures and crops, and stock will not graze it. It is however, a copious producer of nectar, and is worked freely by the bees, particularly in a dry season. The honey is light amber in colour and mild in flavour.

The Canadian stinkweed (*Thlaspi arvence*) is found throughout Marlborough and in districts of the Nelson Province. The bees work this weed as a source of nectar, but I have not yet heard of its being foraged in sufficient quantities to influence the honey to a noticeable extent.

Influence of Native Bush.

In the Nelson Province pennyroyal (*Mentha pulegrum*) has obtained a very strong hold, and in most districts is very materially influencing the honey obtained at the latter end of the season during January and February. In the northern end of the Nelson Province the native bush is similar to that of Westland, and in these districts the bulk of the nectar is obtained from this source. The honey differs from that produced in Westland, in so far as it is influenced by honey produced from sources not available in the Westland Province.

In the preparation of this article I am indebted to Mr. C. S. Neville, Inspector of Stock, Greymouth, for the botanical identification of some of the plants dealt with.

—*G. F. Page, Apiary Instructor, Greymouth.*

Poultry-keeping Section.

Placing Orders, and Artificial Brooding.

THE hatching and rearing season is now advancing, and poultry-keepers who intend to purchase hatching-eggs, day-old chicks, or perching pullets and have not placed their orders should lose no time in doing so. The commercial poultry-keeper who caters for that class of business usually has such a demand for August and September deliveries that late-comers are likely to be disappointed or compelled to take later supplies. As late stock are never satisfactory, it is advisable not to leave the placing of orders until the last minute.

Perching Pullets.

A branch of the business that has made great growth of recent years is the perching-pullet trade. Many commercial poultry-farmers who have had experience and who have the facilities for rearing a large number of pullets cater for this branch of the business. These pullets are usually sold at from eight to ten weeks old and after they have been weaned from the heat and taught to perch. Prices range from 4s. 6d. to 6s. each, according to age.

The writer has known of more than one poultry-keeper who has found this method of renewing his stock the most economical. As one poultry-keeper put it: "I really never had sufficient time to give to the machines and young chicks, with the result that I never made a real success of my pullets, but since I decided to get rid of the incubator and brooder and purchase perching pullets my net returns have been better."

No doubt the poultry-keeper who only requires a limited number of pullets each year to renew his flock, but who has neither time nor the experience to make a success of hatching and brooding, will find it better to purchase well-reared perching pullets. Naturally, those intending to go in for young pullets should place their orders well ahead, so that sufficient supplies may be hatched.

Artificial Brooding.

Although great advancement has been made during recent years in regard to artificial brooding, it is still safe to say that more failures in commercial poultry-farming may be attributed to the inability of the poultry-keeper successfully to renew his flock than to any other cause. It is this branch of poultry-farming that calls for practical experience and an aptitude for the regular and constant attention to many little details.

Observation.

The gift of keen observation is very necessary in order to make a real success of the artificial rearing of a large number of good pullets, as so much depends upon the ability to notice at once any unfavourable symptoms and to remove the cause before serious trouble has time to develop.

If pullets are to do well next autumn and winter and then to make good breeders the following year they must be taken right on week by week without a check from the time they are hatched until maturity. A week's or even a few days' neglect during the developing stage may very easily upset one's plans for a whole year. To be able to detect many of these slight, unfavourable symptoms and to know just how to remove the cause can only be learned by practical experience and keen and constant observation.

The Brooder.

A good brooder supplies the chicks with plenty of room, warmth, and fresh air, and there are many different makes both of the heated and fireless type. A good fireless brooder, properly handled, will raise as good a bird as a good heated brooder, but with the former the chicks require more attention, especially during the early stages.

The canopy or umbrella-shaped brooder, heated by means of electricity or kerosene lamps, is the most popular type of brooder in this country.

Home-made Brooders.

Although some poultry-keepers are very handy with tools and are so mechanically minded that they can make a great deal of their own equipment, the beginner would be well advised to invest a few pounds in a good heated brooder rather than to try making his own. The writer has seen some really good home-made brooders, but in many cases they have not been satisfactory. It is well to remember that it is not so much the cost of the brooder that counts but rather the number and quality of pullets that it raises.

Dryness Essential.

Whatever class of brooder is used, it is essential to see that the chicks have a dry bed, as any dampness under the hover is fatal.

Where the canopy type of brooder is employed it is advisable to use a netting frame as recommended on page 70 of the Department's Bulletin No. 66, "Utility Poultry-keeping." A description of a good, inexpensive, fireless brooder, with details as to its working, is also given in this publication, copies of which may be obtained from the Publisher, Department of Agriculture, Wellington, price 1s., postage free.

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Temperature under Hover.

Instructions as to the working are usually sent out with each brooder, and these should be followed closely.

The experienced poultry-keeper usually keeps a close watch on the chicks and notes how they are acting under the hover. If they crowd, more heat should be given. If they stand up, with their mouths open and are panting, it is a sure sign of too much heat and insufficient ventilation; but if they settle down scattered about under the hover, with no sign of huddling, it can be assumed that the temperature is correct.

Use of a Thermometer.

While the experienced man seldom uses a thermometer in the brooder, the beginner would be wise to do so. When taking the temperature the bulb of the thermometer should be about the same distance from the heat supply as the backs of the chicks. A temperature of about 90° Fahrenheit before the chicks are put in has given good results. It is advisable to reduce the temperature gradually until, by the time the chicks are six weeks old, practically no artificial heat is supplied.

Training the Chicks.

For the first few days, or at least until the chicks know what to do and where to go when they require a warm up, they should be more or less confined. This training during the first few days is very important, for when chicks get cold they seem to become stupid and will stand about in heaps and get chilled. This must be avoided, for if chicks get chilled, especially during the first few days, they seldom recover.

Use Ample Bedding-material.

It is sound economy to use plenty of clean, dry litter, both in the brooder-room and under the hover. Straw, chaff, or shavings make very suitable material, and this should be 1 in. or 2 in. deep so that the chicks will get plenty of exercise scratching among it. They will also be able to settle down in it at night, and be more comfortable. Many poultry-keepers would be able to rear more and better birds if more bedding-material were used and if extra care were taken to see that it was always dry and clean.

Cleanliness.

Too much care cannot be taken to see that everything in connection with brooding and equipment is always clean and dry. Drinking-vessels should be cleaned regularly at least once a day, and care taken to prevent dampness collecting round about. After the first eight or ten days it will pay to clean out the litter, especially from under the hover, every five days; in fact, it is a good plan to put a little fresh bedding-material under the hover each night after the birds are three weeks old.

Grading-up.

When the chickens are about three weeks old it will be found that some have done better than others. If the smaller birds can be placed in a brooder by themselves it is remarkable how many will come on, but if they are left with the larger and stronger ones many will be lost or turned into culls.

This is where an extra brooder is useful, and if many pullets are to be reared the extra brooder will soon pay for itself.

Camping-time Attention.

A careful watch should be kept on the chicks as they camp for the night to see that they do not crowd in heaps around one side of the brooder. If they do this they should be gently spread out. This camping-time attention is a very important detail of rearing-management, as, if not attended to at the correct time, the chicks get into bad habits and trouble is often started.

It is a good plan to lift the hover about 1 in. each week as the chicks grow. If this is done the birds will get more fresh air at night and gradually be hardened off.

Feeding.

Last month the usual Wallaceville method of feeding was given. The following is a "dry mash" feeding-method that has been tried with success at Wallaceville.

Chickens were transferred from the incubator to the brooder at night-time. On the following morning, about forty-eight hours after hatching, dry mash was placed before them in small troughs and was within reach of the chickens at all times. The mash was made up as follows: 40 lb. maize-meal, 20 lb. bran, 14 lb. pollard, and 10 lb. Sussex ground oats.

Finely cracked oyster-shell grit was placed in shallow boxes, to which the chickens had free access at all times. Water, and also skim-milk, was given from the start and a supply kept before them at all times up to six weeks old, when they were removed from the brooder and only water was given.

Green Food.

On the fourth day green food—silver-beet and young green oats finely cut up—was fed three times a day at about 9 a.m., 2 p.m., and the last feed at night at 5 p.m.

From ten weeks old the dry mash consisted of 50 lb. maize-meal, 16 lb. bran, 16 lb. pollard, 4 lb. meat-meal, 4 lb. dried milk (skimmed), ½ lb. salt, 2 lb. bone-flour, 4 lb. linseed.

—C. J. C. Cussen, Chief Poultry Instructor, Wellington.

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N.Z. Federation of Young Farmers' Clubs.

Edited by S. Freeman, Dominion Organizing Secretary.

Educational Week in Wellington.

S. Freeman, Dominion Organizing Secretary.

THE first of its kind to be undertaken in the capital city, a very successful Educational Week was held in Wellington during the week commencing 27th June. Ninety members drawn from the Taranaki, Wanganui, Poverty Bay, Hawke's Bay, Wairarapa, Manawatu, Blenheim, and Nelson districts attended.

In compiling the programme an endeavour was made to provide the visiting members with the opportunity of viewing the more important industrial works and factories in and around Wellington, as well as other places of interest to them as young farmers. Judging by the satisfaction expressed by members generally, the effort was well worth while, and it is more than likely that the activity will be repeated next year.

A group photographed outside the Wellington Town Hall during the Educational Week.

["Dominion" photo.

Opening Proceedings.

The visitors arrived in Wellington during the afternoon of the first day, some travelling by train, others by motor-car or steamer, and still others by aeroplane. They assembled in the Conference Hall, Dominion Farmers' Institute, that evening, and after a short talk by the Dominion Organizing Secretary were addressed by Mr. R. B. Tennent, Director of the Fields Division, on "The Young Farmers' Club Movement." Mr. H. I. Forde, Editor and Departmental Publicity Officer, also addressed the members, and gave them some valuable information in connection with the *New Zealand Journal of Agriculture*. Some interesting sound films relating to agriculture and general subjects were exhibited by Mr. Tennent, and the evening was brought to a close with supper.

At 9 o'clock on the Tuesday morning a civic welcome was tendered at the Town Hall to those attending the Educational Week by the Mayor of Wellington, Mr. T. C. A. Hislop, whose interesting address dealt largely with the interdependence of town and country. On leaving the Town Hall the party was divided into groups, some members visiting the Bryant, May, and Bell Match-factory, and others the Radio Corporation Warehouse. At 11 a.m. the whole party proceeded to the City Milk Depot, where an interesting hour was spent inspecting the machinery and viewing the various processes undergone by the milk before delivery to the Wellington consumers.

Visit to Laboratory.

After lunch buses were chartered and the members were taken to the Wallaceville Veterinary Laboratory, Upper Hutt, where an instructive afternoon was spent. The laboratory staff demonstrated to the visitors all phases of the research work being carried out in the laboratories and on the farm.

On Wednesday the party was conveyed in buses to Lower Hutt and Petone, where during the day groups of members visited the Wellington Woollen-mills, Todd Motors, the Railway Workshops, and the assembly works of both the Ford and General Motors.

The visitors returned to Wellington at 5.30 p.m., and attended a dinner arranged in their honour by the Dominion Executive of the New Zealand Farmers' Union. Mr. W. H. Horrobin, Dominion Treasurer, presided in the absence of the Dominion President, Mr. W. W. Mulholland. Mr. A. P. O'Shea, Dominion Secretary, was also present. Following the dinner the visitors were further entertained at a theatre as the guests of the Farmers' Union.

Address by Minister.

The party assembled at 9 a.m. on Thursday and were shown over Parliament Buildings. Returning to the Dominion Farmers' Institute, they were addressed, after morning tea, by the Minister of Agriculture, the Hon. W. Lee Martin. A lantern lecture entitled "Field Experiments" was given by Mr. J. W. Woodcock, Department of Agriculture, and this was followed by an address by Mr. M. R. O'Shea, Secretary of the New Zealand Manufacturers' Federation, who gave interesting information relating to New Zealand manufactures. Mr. R. G. Buckleton, a prominent member of the federation, also addressed the visitors. In the afternoon the party visited the Dominion Museum and Art Gallery, where the Acting-Director of the Museum, Mr. W. J. Phillips, gave a talk on the Maori section.

On the Friday morning the visitors assembled in the Conference Hall, Dominion Farmers' Institute, and listened to an address on "World Affairs" by the Hon. F. C. Waite, M.L.C. At 10 a.m. the party was conveyed in buses on a sight-seeing trip around the bays. A visit was made to the Massey Memorial, Point Halswell, and morning tea was served at Scorching Bay. After viewing the Rongotai Aerodrome and the site of the Centennial Exhibition the party returned to the city for lunch.

Outstanding Feature of Week.

What was probably the outstanding feature of the week took place after lunch, when the visitors were the guests of the Wellington Harbour Board for the afternoon. They were received at the Harbour Board Office, Queen's Wharf, by the Chairman of the Harbour Board, Mr. C. M. Turrell, and were then conveyed in buses to the Floating Dock. After inspecting the dock they were taken in turn to Pipitea Wharf, Aotea Quay, and along the waterfront generally, where they were shown loading and unloading operations, and inspected the cool stores, &c., officers of the Harbour Board being with the various groups to explain the different features as they proceeded. At 4 p.m. afternoon tea was served on the "Rangitikei," at the conclusion of which the visitors were shown over the ship, including the engine-room, &c.

At 7.30 p.m. the party met in the Conference Hall for a farewell evening. The Organizing Secretary took about eighteen members to the 2YA Broadcasting Station, where an impromptu Y.F.C. broadcast had been arranged. Mr. Freeman opened the proceedings with a short talk on the Educational Week and the programme that had been carried out, and took the opportunity of the presence in the studio of Mr. A. W. Nisbet, Secretary of the Wellington Manufacturers' Association, to thank him and the various manufacturers and others for the assistance and co-operation so kindly given during the week.

After a reply by Mr. Nisbet, the members present were called to the microphone, one by one, to say a few words. In the meantime the rest of the members at the Conference Hall were "listening in" to the broadcast. During the remainder of the evening sound films were exhibited, followed by farewell speeches, Supper was served at the conclusion.

The visitors left Wellington for their respective homes on the following day, the general feeling being that they had profited by their trip to Wellington. Full advantage had been taken of the educational opportunities afforded, many friendships had been made during the week, and an enjoyable holiday had been provided.

Debate with Farmers' Union.

In response to a challenge from the Dovedale Young Farmers' Club, representatives of the Dovedale branch of the New Zealand Farmers' Union met on 5th July to debate the subject "That Modern Science is a Menace to Civilization." The affirmative was taken by the Young Farmers' Club, the speakers comprising Messrs. I. Win, W. Kenyon, and V. Davies. The Farmers' Union representatives, Messrs. P. Cowan, S. Win, and N. Cowan, supported the negative. Mr. E. J. Thompson acted as adjudicator, and Mr. C. Jordan presided.

The debate was keenly contested, and the Young Farmers' Club team emerged the victors by the narrow margin of 261 points to 253. Mr. S. Win was adjudged the best individual speaker of the evening, and it is understood that Messrs. I. Win and W. Kenyon were very close contestants.

A hearty vote of thanks to the chairman brought a pleasant and entertaining evening to a close.

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Manawatu Club's Camping Tour.

P. G. Thevenard, Kimbolton Young Farmers' Club.

THE tour arranged by the Manawatu District Committee was an unqualified success, and was an example of organizing ability and progressiveness. This tour took place from 31st May to 11th June, and 140 young farmers participated, making up the largest Y.F.C. party that has yet undertaken a camping tour in the Dominion. Transport was provided by six Railways Department buses, with a lorry to carry the cooks and their gear, the palliasses, and some of the luggage. The total distance covered by the buses was approximately one thousand three hundred miles.

Members of the Manawatu Club about to embark on buses at Palmerston North.

The party gathered at the showgrounds, Palmerston North, at 10 a.m. on Tuesday, 31st May, and a meeting was held to elect section leaders. A formal welcome was extended by Mr. H. J. Lancaster, District Chairman, who wished the party a pleasant and instructive tour. Mr. J. Hodgens, M.P., Mr. S. Freeman, Dominion Secretary, and Mr. A. J. Galpin, Department of Agriculture, also spoke, extending their best wishes to the touring party. The leader of the party Mr. E. W. Barnett (Halcombe), introduced his assistants—Messrs. G. S. Robinson, Department of Agriculture, acting as secretary on the tour; J. B. Chrystall (Kairanga), treasurer; P. G. Thevenard (Kimbolton), in charge of buses; H. M. Linklater (Pohangina), baggage; and M. Lange (Shannon), assistant baggage.

First Stage of the Trip.

After a light luncheon we embarked into the buses, and after circling the Square, Palmerston North, were on our way to Hawera on the first stage of the trip. The country along the route was a definite change from the Manawatu, and as we neared Hawera shelter became the outstanding feature. All through South Taranaki the boxthorn hedges were prominent. On arrival at Hawera we were welcomed by the members of the South Taranaki Farmers' Union Conference, after which we proceeded to the showgrounds to camp for the first night. The cooks' lorry had gone on ahead, and we found the evening meal well under way. It may be of interest to know that the party consumed the following victuals at an ordinary evening meal: Two and a half big sheep, half a sack of potatoes, half a sack of swedes or pumpkins, 9 gallons of milk pudding, and 4 gallons to 5 gallons of coffee or tea. At breakfast, 10 gallons of porridge and 10 gallons of stew provided an average meal, to say nothing of unlimited bread, butter, and jam. Each bus-load of tourists took its turn at fatigue duty.

As the first night was rather hard, very few got much rest, and daylight found us on the move. Our first visit was to the Maori Redoubt at Turuturu, where we inspected the fortifications and heard an inspiring speech by Mr. Houston, of Hawera, on the history of the redoubt and the Maori wars in the district from 1860 to 1870. After lunch we were shown over the Waimate West Demonstration Farm by the manager and Mr. J. E. Davies, Department of Agriculture. The growth of perennial rye-grass was most noticeable, one pasture sown in February presenting a perfect sward.

Stratford and New Plymouth.

We proceeded to Stratford, where Mr. A. G. Elliott, Department of Agriculture took charge and showed us over the Experimental Farm. This is divided into two 70-acre sections, one part carrying a herd of 45 cows producing 14,000 lb. of butterfat, and the other part carrying 350 ewes grazed on the daily-change rotation system. Our stay at these farms was necessarily brief, and we pushed on to New Plymouth. As we passed through the Midhirst country the neat fields and hedges gave place in many parts to swampy land, blackberry, fern, and ragwort.

Arriving in New Plymouth about 5 p.m., we toured the town and disembarked at Pukekura Park, where, amid picturesque surroundings, we were welcomed by the Mayor, Mr. Gilmour, and representatives of the Chamber of Commerce and the Rotary Club. We proceeded from there to the showgrounds, where we camped for the night. We attended a dance that evening as the guests of the Caledonian Society. Messrs. Barnett, Robinson, Chrystall, and myself gave a fifteen-minutes broadcast on the tour over 2YB at 8 p.m.

Leaving New Plymouth the following morning we visited the 50-acre farm of Mr. Blyde at Lepperton. The butterfat production there is 360 lb. per acre, and we found much to interest us. Leaving there, we set out on the longest and undoubtedly the most scenic part of our journey—over Mount Messenger and up the Awakino Valley. We visited the Waitomo Caves, which made a pleasant break in the afternoon.

Stay at Ruakura Farm.

Nearing Hamilton we encountered heavy fog, but eventually we reached Ruakura Experimental Farm, where we stayed the night, the staff making every effort for our comfort. The next morning, Friday, we were shown over the farm, and among other things we were impressed by the spaciousness of the buildings. We visited the Waikato Winter Show at Hamilton in the afternoon, and it was a very interesting contrast to some of our own district shows. Some of the party assisted at the Department of Agriculture's stall in canvassing subscriptions for the *Journal of Agriculture*. In one instance an outstanding piece of salesmanship came to an end when the prospective subscriber turned out to be a Department official! Our efforts obtained seventy-seven new subscribers to the *Journal*.

The New Zealand Co-operative Dairy Co.'s pig farm at Te Awamutu was on our itinerary the following morning, and under the manager's guidance we inspected the one thousand three hundred pigs carried on the farm. After lunch at Ruakura a football "tourney" was the afternoon's entertainment, and it proved one of the highlights of the tour. The teams were drawn one from each of the six buses and one from Ruakura. In spite of the fact that all were somewhat "green," some excellent football was seen, the final game between buses 5 and 6 being outstanding.

Excursion at Tauranga.

Sunday was a free day, and on Monday morning we headed for Tauranga, via Paeroa and Waihi, the gold-mines and old workings. This was a most interesting trip. We stopped at Katikati for lunch and a swim in the hot baths. At about 3.30 p.m. we arrived at Tauranga, where Mr. C. Walker, Department of Agriculture, had an interesting programme arranged. Some of the party were taken by launch over to the Mount, while the remainder went sight-seeing around the town. A dance that evening, organized by the local club, was a great success.

Early the next morning about thirty-five of the party went on a fishing expedition, and, although the total catch amounted to only one mackerel and four snapper, all enjoyed the trip, many being on the open sea for the first time.

Arriving at Rotorua at 12.30 p.m., we found very comfortable quarters on the racecourse. Our stay in Rotorua was most enjoyable, and the arrangements made for us by Mr. C. S. Dalgliesh, Department of Agriculture, were excellent. After lunch we were shown over Whakarewarewa by Maori guides. That evening we were the guests of the Maori people in the Ohinemutu Pa at a reception and concert to both the visiting English Ladies' Hockey Team and ourselves. The speech of welcome by the Maori chief was a great piece of oratory, and was translated by an interpreter. The leader of our party, Mr. Barnett, replied, and was greeted in true Maori fashion by Ana Hato. The programme included hakas, poi dances, and songs, and concluded with a dance to the strains of a Maori band.

Farms Inspected.

On Wednesday morning we visited the buried village at Wairoa, passing the Green and Blue Lakes, and obtaining a wonderful view of Mount Tarawera. During the afternoon we inspected the farm-development being carried out at the Horohoro and Ngakuru settlements. At Horohoro the Maori school-children welcomed us with hakas and poi dances, and conducted us over the school. The members of the Ngakuru Club showed us over some of the best farms in the district, and there were interesting examples of pumice land which a few years ago was scrub and is now producing outstanding returns.

The Blue and Ward Baths were patronized that evening, and the following morning we left Rotorua for the Chateau Tongariro. We obtained a good view of the Rainbow Mountain, and on nearing Taupo the Huka Falls, glistening in the sunlight, presented a wonderful sight. The bridges over the streams along the shore of Lake Taupo provided some amusement. All had to disembark, and the buses just managed to scrape through, although in some cases the sides of the bridge had to be held apart.

Stay at the Chateau.

We were made very comfortable at the Chateau, and were shown every courtesy by the manager; stretchers and mattresses were a pleasant contrast to our palliasses. As Friday morning was fine, many climbed the slopes of Mount Ruapehu, eighteen eventually reaching the summit. Others inspected the Egmont Box Co.'s Mill, while some patronized the golf-course. That evening in the Chateau lounge we held our final meeting of the tour. A representative from each section gave a brief account of the tour, and presentations were made to the leaders, Messrs. Barnett, Robinson and Chrystall, and also to the drivers of the six buses. A trophy donated by the manager of the Chateau for a competition in connection with the manurial treatment of the golf-course was won by Jack Linklater.

The next morning (Saturday) we set out for Palmerston North, all sorry that the last day of the tour had arrived. Five of the buses took the route through Taihape, Hunterville, and Marton, the others proceeding via Rangiwahia and Kimbolton and dropping passengers from those districts en route.

Tribute to Organizers.

A tribute must be paid to Mr. Barnett's leadership and his untiring energy and resource throughout the trip. Mr. Robinson's work in charge of the commissariat, &c., was invaluable; while the work of the three cooks, even under the most trying circumstances, contributed largely to the success of the tour. The drivers of the buses carried out their duties admirably, and thoroughly entered into the spirit of the tour.

It will be of interest to note that the cost to each member of the party was £5 5s. It can readily be seen that this enabled many of us who could not otherwise have attempted such a tour privately to enjoy a first-class holiday and take part in a very interesting and instructive tour.

Activity of North Canterbury Clubs.

L. W. BLACKMORE, District Secretary, Christchurch.

THERE are at present eight clubs in the Christchurch district, with a total membership of nearly two hundred and fifty young farmers. The attendance in most cases is quite good, especially in the case of the more recently formed clubs. Because of harvesting operations most clubs in this district go into recess from about December to March, and on the average eight to ten meetings are held each year. Lectures are the main form of entertainment at the majority of meetings, but debates, both club and inter-club, hold an important place in the year's activities.

Field-days are arranged by practically all clubs, and they are not behind in social activities. Dances, and in some cases socials, are organized by most clubs. Several clubs have arranged special classes in first aid and wool-classing, and these have proved most successful. One club has provided itself with a challenge cup for a stack-building competition.

Compared with some of the North Island districts, little interest has been taken in stock-judging, but a definite move has now been made to hold a competition at the Christchurch A. and P. Show this year, and it is hoped that the clubs in this district will take a keen interest in this new activity.

A series of nine fifteen-minute broadcast talks were given over Station 3YA last year by club members from the Christchurch and North Canterbury districts, and arrangements have been made for a further series to be given again this year. Dialogues are becoming increasingly popular, and also appear to be more popular among listeners.

Clubs here have taken an active interest in the recent South Island tours made by parties from the North Island districts, and have derived much pleasure and knowledge by contact with them.

A party of sixty members of the clubs in the Christchurch and North Canterbury districts recently "broke new ground" by carrying out the first organized tour of the North Island undertaken by South Island members. They received a hearty welcome from the North Island clubs generally, and thoroughly enjoyed a tour which was most interesting and profitable. A detailed account of the tour will be published shortly.

Eastern Southland Clubs' Dog Trials.

W. Faithful, District Secretary, Gore.

A NEW venture for the clubs in the Gore district was undertaken on 18th May, when sheep-dog trials, open to all members of Eastern Southland clubs, were conducted on the Greenvale Collie Club's course. Before the new project was undertaken the members of this club were approached, and the success of the meeting was due in no small measure to their co-operation and support. Mr. F. Gutschlag, President of the club, donated a trophy for the winner of the head, pull, and hold-in-ring event, and Mr. L. Charleson, Greenvale, consented to act as judge.

There were two events. In the morning the event mentioned above was run off, after which an adjournment was made for luncheon. The Greenvale Club has a comfortable refreshment booth, which was placed at the disposal of the gathering, and the members of the Waikaka Branch of the W.D.F.U. provided luncheon and afternoon tea. In the afternoon a head, pull, hold-in-ring, drive, and yard event was held, after which Mr. Charleson gave a huntaway and heading demonstration.

Address to Competitors.

Following the afternoon-tea interval, the prizes were distributed by Mr. Gutschlag, and Mr. Charleson gave a short address to the competitiors. Mr. Charleson said the organization was to be complimented on its work in encouraging interest in practical farming, and in particular in providing experience for members who might ultimately graduate to the open trials conducted by district societies. The type of dog engaged during the day was the useful farm sort. Naturally, some were a little raw and not under proper command, but much could be done by patient training to improve this.

Mr. M. Kirkpatrick giving a demonstration to the touring party of Taranaki Y.F.C. members.

Results of the two events were as follow :—

Head, Pull, and Hold-in-ring.—E. Gardyne's "Lad," 1; P. Turnbull's "Ted," 2; T. A. Logan's "Scamp," 3; E. Gutschlag's "Lass," 4.

Head, Pull, Hold-in-ring, Drive, and Yard.—G. Byar's "Black," 1; E. Gardyne's "Lad," 2; R. Turnbull's "Ted," 3.

The trials were in every way a complete success and the response given for the initial venture quite up to expectations, and it is hoped that it will be possible to make these trials an annual event.

Hogget-judging Competition.

At the completion of the trials a hogget-judging competition was held. Practically all the Young Farmers' Clubs' members entered, and, after explaining the merits and demerits of the sheep, the judge, Mr. M. Kirkpatrick, Greenvale, announced the winners, who were as follow: E. Gutschlag, 1; W. Kelly, A. Gardyne, T. Logan (all equal), 2.

Mr. Kirkpatrick has shown considerable interest in the Young Farmers' Clubs in Eastern Southland, and on many previous occasions has gladly given his time and service for demonstrations and field-days. As an instance of this, the touring party of Young Farmers' Club members from Taranaki spent a most interesting, although brief, visit to his farm, and watched an instructive demonstration on Romney sheep.

The judge, Mr. L. Charleson, giving a demonstration with his dogs.

New Clubs Formed.

NEW clubs formed during the past few months are as follow: Albury Y.F.C., South Canterbury; Alfredton Y.F.C., Wairarapa; Amuri Y.F.C., North Canterbury; Arapohoe Y.F.C., Dargaville; Hinds Y.F.C., Mid-Canterbury; Karawaka Y.F.C., North Taranaki; Okau-Tongaporutu Y.F.C., North Taranaki; Oroua Downs Y.F.C., Manawatu; Scargill-Omihi Y.F.C., North Canterbury; Urenui Y.F.C., North Taranaki; Wyndham Y.F.C., Western Southland.

The number of clubs now functioning in the Dominion is 155, with a total membership of approximately 4,500.

Among the Clubs: Reports on Activities.

Western Southland.

Dipton.—Lecture by Mr. W. L. Harbord, Department of Agriculture, on "Sheep-grazing."

Lochiel.—Club debate, "Horses *v.* Tractors," which was won by the side favouring tractors. At the previous meeting a debate was held between teams from two visiting clubs, Woodlands and Thornbury. The subject was, "That an Immigration Scheme would greatly Benefit New Zealand." The debate was won by the Woodlands team, who supported the negative.

Thornbury.—Address by Mr. Nichol, of Bluff, on "Whales." Mr. Nichol greatly interested his audience with some of his early experiences in whaling.

Woodlands.—Decided to hold meetings fortnightly in future. Messrs. W. L. Harbord, Department of Agriculture, and R. Raines, Government Meat Inspector, gave a practical demonstration on meat inspection and the location of common diseases in sheep.

Eastern Southland.

Crookston.—Debate, Moa Flat *v.* Crookston, on the subject, "That Grassland Farming is a better Proposition than Arable Farming." Crookston took the negative, and won by a small margin.

Otama.—Address by Mr. Henry Smith, Chairman of the Eastern Southland District Committee, on "Early Farming in Southland." Arrangements made for a debate with the Waikaka Club.

South Otago.

Lawrence.—Magazine evening; member selected to speak over 4YA. At the previous meeting a lecture was given by Mr. R. G. F. Fountain, Principal Inspector of Stock, Dunedin, on "Noxious Weeds."

Milton.—Talk by Mr. F. M. Scott on "Banking."

Stirling.—Lecture by Mr. G. McDonald, M.R.C.V.S., on "Parasites in Horses and Sheep."

Central Otago.

Alexandra.—Business meeting. Arrangements made for a football match with the Roxburgh Club and also a Y.F.C. football tournament.

Arrowtown.—Talk by Mr. R. J. McIntyre, Inspector of Stock, Queenstown, on "Supplementary Feeding of Stock during the Winter Months."

Roxburgh.—Competition for cup. It was decided that each member should give a short talk during the year on some aspect of his work. Address by Rev. D. D. Heggie on "Travels in the South of England." At the previous meeting a cinema film was exhibited dealing with tractors.

Upper Clutha.—Lecture by Mr. G. G. Calder, Department of Agriculture, on "Regrassing in Central Otago."

Dunedin.

Middlemarch.—Lecture by Mr. S. H. Saxby, Department of Agriculture, on "Farm Seeds."

Palmerston South.—General business. Lecture by Mr. S. H. Saxby on "The Buying of Farm Seeds." The speaker stressed the importance of purity and germination.

South Taieri.—Lecture by Mr. J. M. Smith, Department of Agriculture, on "Manures and Manuring."

North Otago.

Duntroon.—Talk by Mr. A. Ingram, Inspector of Stock, Oamaru, on "The Diseases of Various Stock, and their Remedies." At previous meetings talks were given by Mr. J. T. Kibblewhite on "Tree-planting," and Mr. T. A. Sellwood, Department of Agriculture, on "Mangel-growing."

Enfield.—Papers were read by nine members on "The Financing and Management of a Farm," the particulars of which were as follows: Tenure, freehold; cost, £20 per acre; capital, £1,500. A report on the District Executive Meeting was given by R. Wilkenson. A discussion took place on the short course at Lincoln College and the wool-classing course at Oamaru.

Five Forks.—Debate, the subject being "Is Modern Civilization a Failure?" A. Heron, P. Cooney, and A. Ellis spoke for the affirmative, and J. Rutherford, T. Hogg, and W. Kingan for the negative. The negative won by a small margin, T. Hogg and W. Kingan being adjudged the best speakers. Mr. Austin acted as judge.

Hampden.—Talk by Mr. S. Craig, Inspector of Stock, on "Diseases of Stock."

Papakaio.—Lecture by Mr. T. A. Sellwood, Department of Agriculture, on "Mangel-growing."

Tokarahi.—Lantern lecture on "Modern Farm Implements" by Mr. E. Reid.

Waitaki-Hilderthorpe.—Lecture by Mr. J. Simpson on "Farm Finance." At the previous meeting Mr. T. A. Sellwood, Department of Agriculture, gave a lecture on "Mangel-growing."

South Canterbury.

Albury.—Business meeting; decided to hold meetings every three weeks; delegates selected for District Committee. This is a new club which shows great promise.

Arno.—Film exhibited entitled "Our Daily Bread." Talk on "The Management of Breeding-ewes" by Mr. Alan Grant. At a previous meeting a talk was given by Mr. H. B. S. Johnstone on "Tree-planting on the Farm"; a demonstration of tree-planting was also given by Mr. Johnstone at a field-day on his property. Members of the Arno Club also attended a combined field-day at Mr. J. Dempsey's farm, where demonstrations were given as follows: Horses, Mr. J. R. Patrick; fat cattle and dairy cattle, Mr. A. M. Patterson.

Geraldine.—Lecture by Mr. E. J. Lukey, Government Veterinarian, on "Diseases of the Horse." Arrangements for visit to Temuka Public Works, and also interchange of visits with Pleasant Point Club.

Hunter.—Debate arranged for next meeting. Mr. A. Johnston and Mr. Johnston, jun., were the speakers for the evening. The former gave an address on "The Development of Herd-testing and its Importance to the Dairy Farmer," and the latter gave a practical demonstration of testing milk.

Maungati.—Arrangements for a debate with the Southburn Club. Impromptu speeches were given, all members participating. At the previous meeting a lecture on "First Aid" was given by Mr. Dunn; Mr. Chapman assisted in practical demonstrations.

Pleasant Point.—Lecture by F. Clarke, a club member, on his recent trip to Australia. At the previous meeting a debate was held on the subject "That the Tractor is Superior to the Horse." The speakers for the affirmative were R. S. France, J. Crombie, and A. Talbot, and for the negative, W. Wilson, O. Chapman, and F. Jackson. Mr. Elphick acted as judge. Members of the club attended the combined field-day, mentioned in the Arno Club report above, on Mr. J. Dempsey's property.

Southburn-Lyalldale.—Lantern lecture by Mr. J. Steele, of Timaru, on "Farm Shelter." A field-day was held on Mr. R. B. Williams' property, Lyalldale; demonstrations included the vaccination of ewes against pulpy kidney, by Mr. E. J. Lukey, Government Veterinarian.

Waihaorunga.—Lecture by Mr. Haywood, manager of the Waimate Dairy Factory, on "The Care of Cream, and its

Preparation for Butter-making." At the previous meeting a lantern lecture was given on "Astronomy" by Mr. Leadbetter. Members of the club attended the combined field-day mentioned in the Arno Club report.

Mid-Canterbury.

Mayfield.—Lecture on "Irrigation" by Messrs. Beck, Public Works Department, and W. C. Stafford, Department of Agriculture.

Christchurch.

Darfield.—Business meeting. Programme arranged until September, and debate finalized with Farmers' Union. A challenge cup was received for stock-judging. Arrangements were made for annual ball, and also a dance to be held in October to provide funds to send a member to compete in Annual Y.F.C. Stock-judging Championships. It was decided to challenge the Ellesmere Club to a Rugby football match.

Dunsandel.—Lecture by Mr. G. K, L. Knott, M.R.C.V.S., Government Veterinarian, on "Lamb Mortality." At the previous meeting a lecture was given by Mr. A. V. F. Allo, Department of Agriculture, on "Fertilizers."

Ellesmere.—Arrangements for debate with Darfield Club, and also a broadcast from 3YA. Lecture by Professor E. R. Hudson, Lincoln College, on "Agriculture in Australia and New Zealand."

Teddington.—Address by A. H. C. Nutt, a club member, on "English Farming." At previous meetings talks were given by Messrs. F. R. H. Archer and G. Ferguson on "Engineering" and "A Trip through America" respectively.

North Canterbury.

Amberley.—Business meeting. Arrangements made in connection with the North Island tour. The dance was postponed until after the tour.

Cust.—E. Rands and D. Blackmore, club members, gave short talks on "Cement."

Hawarden.—Short talks by members on "Useful Hints for the Farm," all members present taking part.

Oxford.—Address by Mr. Carpenter on "Trees of Other Lands."

Scargill-Omihi.—Arrangements of programme, &c. Two short debates were held, the subjects being "Horse *v.* Tractor" and "Top-dressing is Beneficial." At the previous meeting an address was given by Mr. E. R. D. Smith, of Rangiora. Mr. Smith spoke on "Farm Finance, and the Conduct of Meetings," mentioning the duties of club officials. This is a new club with a membership of twenty-five already.

Marlborough.

Blenheim.—Talk by Mr. E. F. Hea'ey on his trip to Canada during the Ottawa Conference; Mr. Healey dealt solely with his observations of farming methods in Canada. At the previous meeting Mr. J. R. Frame spoke on "Preparing the Wool Clip for the Selling Bench." An interesting inter-club debate was held with the Seddon Club and was won by the latter club. The subject was, "That Fat-lamb Raising is more Profitable than Wool-growing on Medium to Good Grassland." The leaders were W. Dysart (Seddon) and J. Cresswell (Blenheim). The judge was Mr. N. R. McMurtry.

Seddon.—Address by Mr. C. P. Gainsford on his extended tour of Great Britain. Mr. Gainsford spoke at length on the land and the methods of farming in a number of the counties of England and Scotland. At the previous meeting a practice debate was held to choose a team for the debate with Blenheim Club.

Nelson.

Dovedale.—Business and social meeting; arrangements for dog trials. The greater portion of the evening was spent in music, mirth, and melody in an attempt to bring latent talent to the fore. All members present took part in either vocal or instrumental items, and the evening was a great success.

Motueka.—Lecture by Mr. Chas. Lowe on "The Early History of Tobacco."

Moutere.—Arrangements for a debate at the next meeting. An interesting and instructive demonstration of soldering was given by P. Evers, a club member.

Manawatu.

Apiti.—Team selected for debating competition, and club dance finalized. A discussion took place on stock-judging competition. A film was exhibited showing caterpillar tractors.

Bunnythorpe.—Lecture by Mr. A. J. Galpin, Department of Agriculture, on "Top-dressing." At the previous meeting Mr. L. W. Gorman, Plant Research Station, lectured on "Strains of Grasses and Clovers."

Colyton.—Arrangements for club dance; lecture by Mr. L. J. Wild, Feilding Agricultural High School, on "Agriculture Abroad."

Fitzherbert.—Discussion on the debating contest. A lantern lecture was given by Mr. H. R. Denize, Inspector of Stock, on "Animal Husbandry." Mr. E. E. Elphick, Government Veterinarian, was also present, and spoke on "The Care and Attention of Animals."

Halcombe.—Debate with Junior W.D.F.U.

Johnsonville.—Lecture by Mr. J. W. Woodcock, Crop Experimentalist, Department of Agriculture, on "Soil Fertility."

Kairanga.—Business: Debating contest, radio broadcasts, social. A discussion took place on the subject "That Fat-lamb Raising is more Profitable than Dairy-farming in the Manawatu." A debate was also held, the subject being "That Girls should take part in Y.F.C. Activities." Speakers for the affirmative were B. Rowland and W. Bennett, and for the negative J. Gayford and B. Neill. The supporters of the negative were awarded the decision on the vote of the meeting.

Kimbolton - Kiwitea.—Debate on the subject "That a Combination of Cropping and Pastures is more Profitable than All-grass Farming."

Levin.—A team was selected for a debate with Shannon Club. A club debate, "Horses *v.* Tractors," resulted in a draw, both sides scoring 44½ points. A social evening was held at the home of Mr. and Mrs. R. Law, "Te Rohenga." Approximately fifty attended.

Otaki - Te Horo.—Arrangements were made for a field-day at Levin and a discussion took place on the debating contest. A lecture was given by Mr. D. H. Le Souef, Government Veterinarian, on "Stock Diseases."

Rangiotu.—Discussion on the forthcoming Educational Week at Wellington; talks on the Manawatu North Island camping tour by P. D. Ryan, J. P. Ryan, E. Caske, and E. Donaldson (club members).

Rangiwahia.—Film exhibited by Mr. T. Kidd showing caterpillar tractors. A field-day was held on Mr. W. E. Boshier's farm. The demonstrations included a post mortem on a weaner pig by Mr. H. R. Denize, Stock Inspector. Mr. E. Neilson gave an address on "Pig-recording Clubs," and Mr. Denize spoke on "Animal Diseases." Mr. Denize also gave a practical demonstration of the mammitis test.

Shannon.—Team selected for debating contest. Vote of thanks to be sent to the ladies who ran a very successful street stall on behalf of the club. Lecture by Mr. G. S. Robinson, Department of Agriculture, on "Top-dressing."

Woodville.—Delegates elected to Farmers' Union Provincial Executive. Address by Mr. Charfield on "The Sydney Royal Show, and a Tour of Parts of Australia."

Wairarapa.

Ballance.—Invitation to combined field-day with Mangatainoka Club, and team selected for debate; question evening and general discussion. Reports were received from three members who attended the Wellington Educational Week.

Carterton. — Final arrangements for club's birthday party; field-day to be held at Wairarapa Training Farm. Reports by P. Swinn on the Wellington Educational Week, and H. McKenzie on the Y.F.C. Day at the National Dairy Show, Palmerston North. A debate was held on "Town Life *v.* Country Life." The speakers were A. Fisher, P. Swinn, and F. Ward (Town); J. Milne, C. Bliss, and N. Palmer (Country). The town supporters won by a small margin. Mr. E. Fisher acted as judge.

Eketahuna.—Talks by club members: "The Educational Week" at Wellington (E. M. Wright); "The Wairarapa Clubs' Tour of the North Island" (R. J. Laurence). A talk on "Pig Husbandry" was given by Mr. A. G. Golder.

Greytown.—Lecture by Mr. N. Lamont, Department of Agriculture, on "Farm Pests."

Martinborough.—Lecture by Mr. M. Davey, Department of Agriculture, on "The Establishment and Maintenance of a Homestead Orchard."

Masterton.—Talking film entitled "The Romantic Quest for Oil in Sumatra." The film dealt with the initial boring down to the use of the benzine and lubricating-oil in vehicles, and showed the uses of the various by-products. Final arrangements for the annual club ball were made.

Pongaroa.—Lecture by Mr. N. Lamont, Department of Agriculture, on "Rotational Grazing."

Southern Hawke's Bay.

Dannevirke.—Arrangements made for field-day, dog trial, and stock-judging. Address by Dr. Boyd on Niue Island.

Onga Onga.—It was decided to hold a mangel-crop competition during the season. The club is to co-operate with the farmers' union in their forthcoming field-day. A review of the Wellington Educational Week was given by members who attended.

Takapau.—Discussion on lecturers and programmes for future meetings; address by Mr. Henry on "Modern Education."

Northern Hawke's Bay.

Meeanee.—General business; correspondence with Patangata County Council *re* sheep-worrying. Discussion *re* radio broadcasts. Lecture by Mr. R. Arber on "Mineral Deficiency in Stock." At the previous meeting Mr. R. P. Hill, Department of Agriculture, gave a lecture on "Rye-grass Seed," dealing mainly with the fungus disease affecting the germination.

Nuhaka. — Final arrangements were made for the club dance. A lecture was given by Mr. T. Le C. Powdrell on "Chilled Beef."

Poverty Bay.

Gisborne.—Address by Mr. Houston on "Banking and Cheques." Talk by Mr. W. E. Chamberlain on "Club Affairs."

Te Karaka. — Arrangements for a debate; lecture by Mr. J. C. Graham on the "Fat-lamb Trade."

Tolaga Bay.—Lectures by Messrs. C. A. O'Connell on "Tree-planting" and J. Irving on "Splints in Horses."

Wanganui.

Bulls.—Debate, "All-grassland Farming *v.* Grass and Supplementary Feeding." Club members paid a visit during the month to the Feilding Freezing-works, where Mr. Williamson, of the Meat Producers' Board, gave an interesting address on the different types of carcasses in both chilled beef and mutton.

Taihape.—Club debate, "That Immigration is in the Best Interests of New Zealand." The debate was judged and criticized by Mr. T. C. Kincaid. At the previous meeting an address was given by Mr. J. Bartosh on "Farming Abroad as viewed in the Course of a World Tour."

Waimarino.—The prize of £1 1s. for the member who introduced the most new members to the club was won by A. Hammond, who presented half the amount to the club funds. A very interesting explanatory address on debating was given by Mr. J. Murdock. This was followed by a short debate, the subject being "That the Tractor will eventually entirely take the Place of the Horse on the Farm" the side supporting the affirmative being declared the winners. Impromptu speeches on the subject of "Sheep *v.* Dairy Farming" were given by several members.

Westmere.—Reports given of the district executive meeting; arrangements made for field-day. Address by Mr. J. H. Littlejohn on "Wanderings in Tasmania and Australia."

South Taranaki.

Alton.—Lecture by Mr. J. E. Davies, Department of Agriculture, on "The Control of Pastures." At the previous meeting Mr. C. Palmer, of Alton, gave an interesting talk and demonstration on the "Developing and Printing of Photographic Films."

Hawera.—Club debate, "That the Settler on the Land To-day has better Possibilities of Success than the Settler in the Past." The speakers were E. Gane, J. Quinn, and A. L. Barr (affirmative), and W. Phillips, M. Bain, and P. Heise (negative). The judge, Mr. P. O. Veale, gave the award in favour of the affirmative.

Kaponga.—It was decided to accept a challenge to a euchre tourney by the Cardiff Club at an early date. Question evening; all members took part, answering at least one question each.

Whenuakura.—Arrangements for forthcoming club dance. Short talks by members, and description of South Island tour by a member of the touring party. Impromptu speeches by ten members (three minutes each).

North Taranaki.

Cardiff.—Arrangements for annual ball; delegates to District Committee elected. A euchre tourney was arranged with the Pukengahu Club. Talk by Mr. Morgan, New Zealand Loan and Mercantile, Stratford, on "Stock and Station Agents." At the previous meeting N. Jordan and J. Sexton (club members) gave an account of the Y.F.C. Day at the National Dairy Show, Palmerston North.

Karawaka.—Election of Committee, &c. Lecture by Mr. J. N. Blyde, of Lepperton, on "Farm-management Problems." This is a new club, the membership of which has already reached twenty-seven.

Toko.—Field-day on the property of Mr. J. N. Blyde, Lepperton. Mr. Blyde gave an interesting insight in regard to management on a high-production dairy-farm. The total attendance was twenty-two, including some visiting club members. A business meeting was held in the evening, and arrangements were finalized for a club dance. Mr. Marfell made some useful suggestions for a field-day to be held at a future date.

Tongaporutu-Okau.—Lecture by Mr. C. H. M. Sorenson on "Pig-farming. This is a new club with good prospects.

Te Kuiti.

Aria.—Delegates to provincial meeting elected. All members present contributed to talks on "Countries we Would Like to See." A field-day was held in Mr. Rutherford's orchard, a demonstration on the pruning of fruit-trees (apples, peaches, and gooseberries) being given by Mr. R. G. I. Hamilton, Department of Agriculture.

Otorohanga.—Presentation by Mr. K. M. Montgomery, District Secretary, of the cups won by R. Miln (Te Anga Club) at the Otorohanga Agricultural and Pastoral Association Show. A field-day was held on Mr. L. Palmer's property, River Road, at which Mr. R. G. I. Hamilton, Department of Agriculture, gave demonstrations of pruning, &c.

Te Anga.—Field-day on Mr. R. Holmes' property. Mr. R. G. I. Hamilton, Department of Agriculture, gave demonstrations of pruning.

Bay of Plenty.

Katikati.—Practice debate to be held in preparation for debating contest. Arrangements made for a demonstration of an electric fence. Four members who undertook the South Island tour gave talks on the trip, each taking a portion of the journey.

Opotiki.—Arrangements for a debate at Waimana, a rally at Te Puke, and a club dance to be held at Woodlands. Members who took part in the South Island tour related their experiences.

Paengaroa.—Rally of district clubs at Te Puke; club's second birthday party; teams selected for debate. Short talks on their impressions of the South Island were given by ten of the fifteen club members who took part in the recent tour—namely, Messrs. Benner, Nix, Marsh, Hickson, S. McDowell, Mundt, Pinker, Galpin, Blackmore, and Walter.

Te Puke.—Social Committee formed; arrangements for district rally at Te Puke; debating contest, &c.

Waihi.—Judge and coach selected for debates; talks given by members who took part in the recent tour of the South Island.

Rotorua.

Horohoro.—Business meeting to finalize the forthcoming field-day, and arrange a tour for club members. The field-day was held on Mr. P. Kapene's premises, and took the form of a demonstration by Mr. J. B. Murphy on the home-curing of bacon.

Putaruru.—Addresses by Messrs. R. Baldwin and G. McGowan on the work done by the Rabbit Board and the progress of the Putaruru Show respectively. A field-day was held on the properties of Messrs. T. J. McGowan and J. E. Duxfield. Demonstrations included the points of a horse and getting it ready for work (Mr. E. Leslie), and judging of haystacks (Mr. McGowan). An inspection was made of Mr. Duxfield's dairy and pastures.

Waikato.

Matangi.—Address on agricultural problems by Dr. H. E. Annett.

Te Kowhai.—Delegates selected to attend District Committee meeting. Lecture by Mr. D. Marshall, Government Veterinarian, on "Diseases in Cattle." The speaker dealt with worms, calving troubles, milk-fever, grass-staggers, sterility, mammitis, tuberculosis, "wooden tongue" and "lumpy jaw," Johnne's disease, facial eczema, and bloat. The public generally were invited to hear Mr. Marshall's lecture, and the attendance was more than sixty.

Auckland.

Mangatawhiri.—Visit made to Reid Rubber Mills and McEwen's Machinery and Glass Works, Penrose. This club is making very good progress. A valuable library of agricultural books has been acquired, and is already proving an asset to the club and to the members generally.

North Auckland.

Matarau.—Selection of delegates to provincial meeting. Lectures as follows: Mr. J. N. Brown, of the Whangarei Group Herd-testing Association, spoke on "Herd-testing and Testing for Mammitis"; Mr. W. A. Beattie, of the North Auckland Pig Council, spoke on the Whangarei bacon championships.

Y.F.C. Stationery.

THE following is a list of stationery, &c., which can be obtained by club secretaries on application to the Y.F.C. Dominion Organizing Secretary, care of Department of Agriculture, Wellington:—

Y.F.C. Writing Pads (comprising 100 sheets: 50 headed and 50 duplicate), 1s. 3d. each.

Y.F.C. Envelopes (ordinary business type, with N.Z. Federation of Young Farmers' Clubs printed at the top), 9d. for 50.

Notice of Meeting Cards, 1s. 3d. per 100.

Y.F.C. Badges (enamel on metal), 1s. each.

The above are all post free. Cash should be sent with order.

Y.F.C. Blazers can also be supplied, made to measure. These are royal blue in colour, with gilt buttons, and the Y.F.C. badge is worked in yellow on the pocket. They are available in best-quality woollen gabardine at 33s. 6d. each, post free. A cheaper quality, in flannel, can be supplied at 28s. 6d. each. Self-measurement charts will be forwarded to club secretaries on application. The Y.F.C. monogram badges only may be obtained at 4s. 9d. each.

Sheep in New Zealand.

THE following is the interim return of sheep in the Dominion on 30th April, 1938:—

Approximate Number of Sheep in the Dominion on the 30th April, 1938.

District.	Number of Sheep.		Increase.
	Final Return, 1937.	Interim Return, 1938.	
Auckland	3,541,861	3,811,633	269,772
Gisborne - Hawke's Bay	6,903,152	7,119,102	215,950
Wellington - West Coast	6,620,122	6,714,793	94,671
North Island totals ..	17,065,135	17,645,528	580,393
Marlborough - Nelson - Westland ..	1,454,948	1,527,435	72,487
Canterbury-Kaikoura	6,173,076	6,529,976	356,900
Otago	6,612,659	6,693,921	81,262
South Island totals ..	14,240,683	14,751,332	510,649
Dominion totals	31,305,818	32,396,860	1,091,042

Number of Sheep in the Dominion and Export of Mutton and Lamb for the Past Ten Years.

Year ended 30th April,	Number of Sheep in Dominion.	Mutton Carcasses exported.	Legs and Pieces exported.	Lamb Carcasses exported.
			Cwt.	
1929	29,051,382	1,922,242	4,337	5,957,578
1930	30,841,287	1,977,949	5,047	6,182,930
1931	29,792,516	2,473,531	3,428	7,627,164
1932	28,691,788	2,574,222	5,043	8,393,392
1933	27,755,966	2,370,483	2,480	8,840,130
1934	28,649,038	2,064,675	1,256	8,761,218
1935	29,076,754	2,189,300	2,501	9,316,873
1936	30,113,704	1,850,166	225	8,234,060
1937	31,305,818	1,692,610	56	8,770,630
1938	32,396,860*	1,824,236	177	8,959,560

* Interim return.

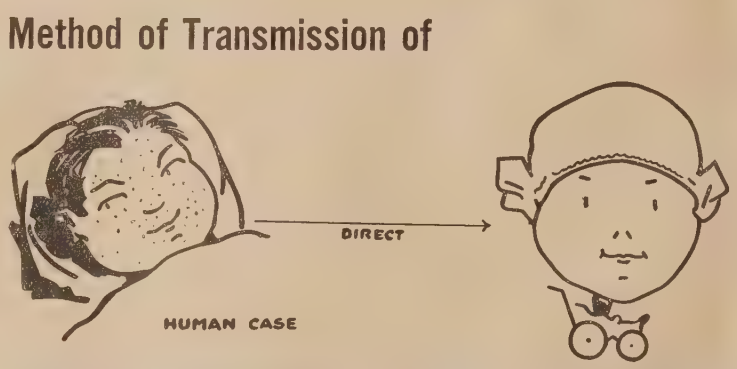
Health Notes for the Farm.

Contributed by the Department of Health.

Fighting the Germ Foes of Children.

Combative Measures for Diphtheria and Measles.

Slowly humanity is awakening to the danger and beginning to fight consciously against disease. The searchlights of science are lighting up the battlefields and revealing the hidden foe. Scientists in the past half-century have unmasked a number of the germ armies and found out how to defeat them. These victories, fought and won in the laboratory, are fraught with greater good for humanity than all the victories in all the wars that have taken place since the world began. —"The Conquest of Disease," by David Masters.



INFECTIOUS diseases among children are very important from the standpoint of those responsible for guarding the public health, because no other diseases so seriously endanger young life and general health and interfere with the education of children by diminishing their school attendance.

Early Symptoms.

The purpose of this article is to draw particular attention to the early symptoms and signs of two of these diseases—namely, diphtheria and measles—so that country parents may recognize them, and so be enabled to take immediate steps to prevent their serious consequences by obtaining prompt medical advice and observing the necessary precautionary measures against the spread of infection.

By way of introduction it might be stated that if a child is suspected to be suffering from or sickening with an infectious disease it should be kept away from other children. It might also be stressed that it is a fundamental mistake to hasten the return to school of children from slight attacks of illness, or by allowing the attendance at school of children from infected houses, as such children are the most fertile source of school epidemics. The doctor and the Medical Officer of Health are required by law to perform certain duties for the protection of the community in this respect, and it is the duty of parents to comply with these requirements.

Transmission of Infection.

It has been proved for diphtheria and enteric or typhoid fever—and, although not yet demonstrated, is almost equally certain for such common complaints as measles, scarlet fever, mumps, and chicken pox—that infection is transmitted from child to child by minute particles, or germs, which are active agents causing the disease, the germs of each individual disease having special distinctive characteristics. In other words, these diseases "breed true." The germ of scarlet fever, for instance, does not produce measles, or *vice versa*.

These germs may be carried from child to child by direct contact, as when a girl convalescent from diphtheria kisses another girl, or when mucus from the throat of a child suffering from an infectious disease is coughed into the face of another child. This is called direct infection. Germs may also be carried from child to child, and frequently are, by indirect contact by the hands, or from contaminated articles, such as sweets, lead pencils, &c. Thus, by direct and indirect ways disease may be transmitted from one child to another.

Period following Infection.

Now, what takes place when a child receives infection? There first occurs a laten period, or what is known as a period of incubation, in which no symptoms occur after the germ or organism causing the disease has found a lodgment in the body. This period is, perhaps, partly occupied by the multiplication of the germ, partly by the

elaboration of their poisons, and partly by the fixing of these poisons into the tissues and cells of the body. This period is succeeded by the period of invasion, when the characteristic symptoms of the disease are suddenly or gradually manifested—that is, after a varying interval the patient is seized with the symptoms of onset.

At this time a child may be attending school, and, if so, he is capable of spreading disease from the first moment the symptoms occur. Indeed, most infectious diseases are usually more intensely infectious in the first three days of an attack than at any later period. Hence the double importance of early recognition.

Diphtheria.

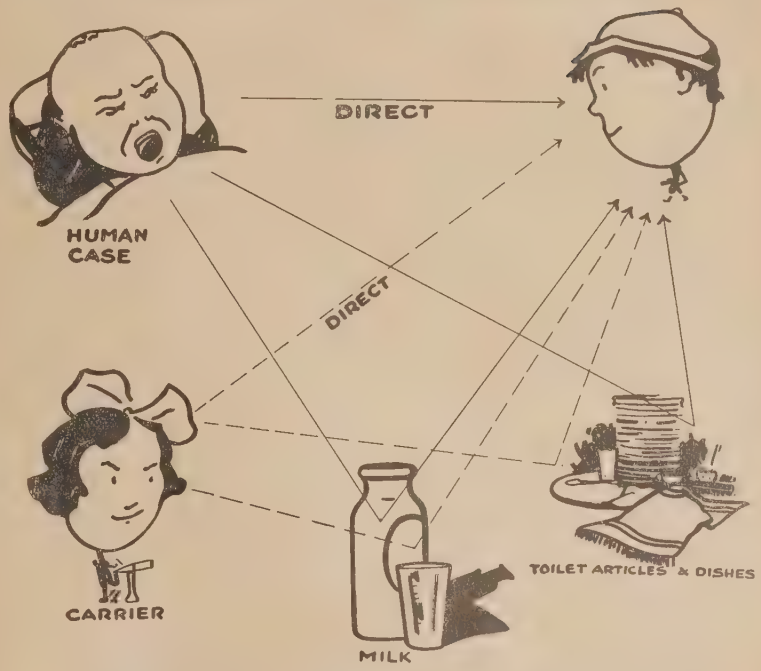
Diphtheria has been recognized for ages. Hippocrates probably alluded to it in describing a "web on the tonsil," and in mediæval writings are many references to a suffocative disease of the throat. It was known in the East for centuries, and referred to in the Babylonian Talmud. Throat pestilences are mentioned in the Middle Ages. Severe epidemics occurred in Europe and in England in the sixteenth century. George Washington died of this disease.

It is interesting to read that Napoleon was roused by the death of his nephew at the age of four to offer a prize for the best work on croup. This nephew was a son of Louis Bonaparte, and died of croup in his mother's arms. In spite of Napoleon's offer, it was a long time before medical science advanced sufficiently either to find a cure or a method of precaution for diphtheria, or croup, as it was then called.

The late Dr. W. Collins stated in 1921 that he had arrived in Wellington in 1878 at the end of a severe epidemic of diphtheria. In one instance every child of a large family succumbed, in many other families one or two died. In 1884 the causal organism of diphtheria was identified, and in the following year the case against this organism was proved. In 1892 a child who was desperately ill with diphtheria in a Berlin hospital was the first child to be treated with anti-toxin with a favourable result.

Anti-toxin in New Zealand.

From the *New Zealand Medical Journal* of April, 1895, we learn that the Government obtained from the British Institute of Preventive Medicine a supply of diphtheria anti-toxin which was distributed among the local hospitals. In the July issue of the same *Journal* Dr. W. Hislop, of Petone, and Dr. J. R. Purdy, Medical Officer of Health, Hutt County



Method of Transmission of DIPHTHERIA.

Council, reported most encouraging results arising from the use of this anti-toxin. Dr. Purdy, in his notes on one case of a seriously ill child states, "Having heard from Sir P. Buckley that the Government had procured some anti-toxin and sent it to the hospital for distribution, I drove hurriedly back to the Hutt and telephoned to the hospital. Dr. Ewart very kindly sent some out immediately by train. I drove back to my case and injected anti-toxin." This child was practically well four days after the first injection.

The drop in deaths from diphtheria following the introduction of anti-toxin has been remarkable during the forty-three years of its use in New Zealand. In 1913 a new method was suggested of protecting children against diphtheria by the injection of toxin anti-toxin mixtures, which will be referred to later in this article. It can thus be seen that only from 1884 can we be said to have got to grips with the cure and prevention of diphtheria.

Early Signs.

The onset of this disease is usually less sudden than is some infectious diseases. The sore throat comes on gradually. There is a rise in temperature, which is moderate in some cases, accompanied by a headache. There is slight hoarseness and rough cough, to which the term "croupy" has been applied. The voice becomes husky, and may be reduced to a whisper. The patient becomes languid, and sometimes drowsy and apathetic. White patches can usually be seen on the tonsils when the tongue is depressed.

It is not necessary that an exact diagnosis should be made, because every child suffering from a sore throat should be regarded as dangerously infectious. If the glands of the neck below and behind the lower jaw are enlarged the case is still more suspicious. If a child is sick with a sore throat it is very advisable to seek medical advice. If it is diphtheria, delay is dangerous.

Remedial Measures.

If it looks like diphtheria the doctor will administer what is known as anti-toxin, which has saved many lives. He will take a culture from a child's throat or nose and isolate the patient. Do not insist on waiting for an exact diagnosis if the doctor advises anti-toxin. The delay may be dangerous. There are few diseases where early treatment is so efficacious and so fraught with hope as in diphtheria. Were it possible to apply anti-toxin in sufficient doses and early enough in all cases mortality from diphtheria would almost vanish. As it is, the

disease has been robbed of much of its former terror provided treatment is immediately obtained.

Prevention.

In preventing diphtheria great success is being achieved by giving children a dose of a special preventive liquid, and many thousands of children in New Zealand have, with their parents' consent, received this treatment. In the East Cape Health District, where a large proportion of children have been immunized, diphtheria among children has fallen greatly in incidence, and this means that there has been a saving of child life in the adoption of this most effective means which science has given to combat this treacherous disease.

It is therefore desirable that attention should be paid to the advantages of diphtheria immunization for the protection of children. Your doctor, the local Medical Officer of Health, or the school doctor will give you fuller information on this preventive measure.

Measles.

The origin of this disease lies in the remote past. Susceptibility to measles is almost universal for the human race. One attack in man produces individual and active immunity which protects for life. Exceptions to this rule, while they do occur, are rare, and most supposed second attacks are cases of mistaken diagnoses. Although this disease is often mild and transient it may be exceedingly dangerous through complications developing.

It tends to be more severe in children under six years of age. In older children it is not so deadly of itself, but it lowers the resistance of the patient and opens the gate for the introduction of germs of other diseases. It is therefore necessary that care should be taken, even when the illness is apparently slight in character.

Symptoms.

Measles begin with all the symptoms of a bad cold in the head, causing running at the eyes and nose. Symptoms develop commonly about eleven days after exposure to infection. There is increasing feverishness, and then, about the fourth day, spots begin to appear on the forehead and face, and soon spread over the entire body. The spots collect in large red blotches and itch. Remaining at its height for a day or two, the disease, as a rule, abates gradually, and at the end of a fortnight, or perhaps sooner, the child is practically well.

The course, however, may be less favourable, the disease assuming a virulent form almost from the onset. It may give rise to complications, especially bronchitis and bronchial pneumonia. Other complications are disease of the middle ear, leading to ear discharge, and this may be associated with inflammatory conditions of the eyelids and a tendency to serious weakness of the eyes, which, unless due care is taken, may become permanent.

Care and Treatment.

As soon as a child shows signs of measles he should be kept indoors and put to bed at once, in a separate room if possible. There should be no glaring light, either by day or night. Keep the room comfortably warm and well ventilated. The diet should be light in character, and the bowels kept well open. It is advisable to call the doctor at once, as neglect of skilled treatment may result in serious consequences. The doctor and the person nursing the patient should be the the only ones to enter the sick-room. Measles can be easily caught, so that every endeavour should be made to prevent its spread to others.

Keep the child in bed for at least four days after the rash has subsided and the temperature normal. Do not let the child strain his eyes in poring over finely printed books. Be careful that there is no exposure to cold until the health is completely re-established. If possible, after an attack of measles a good holiday in the country or at the seaside is advisable. It should be remembered that measles is considered to be most infectious from the onset of the catarrhal symptoms to the disappearance of the eruption.

It is a harmful doctrine that all children must have all the common infectious diseases and therefore may as well be exposed to infection in order to have it all over while young. The older a child when disease occurs the less danger is there of permanent harm.

Resisting Infection.

In conclusion, parents should not be obsessed with the risks of infection to their children or to themselves. Far from it. The wise policy is to learn how to keep fit and well and not worry about disease while you and your children are well. See that your child is trained in the laws of health, is brought up to love cleanliness, sunlight, and fresh air, is properly fed and clothed, and receives adequate rest, so that he may grow up hardy and strong and be able to resist infection.

A parent who passes on such a heritage to her child endows him with something of inestimable value for his future health and well-being.

Slaughterings of Stock.

THE following return of slaughterings of stock at meat-export slaughterhouses and abattoirs for the two months, May and June, 1938, has been compiled by the Live-stock Division :—

——	Cattle.	Calves.	Sheep.	Sheep, of which Ewes.	Lambs.	Pigs.
North Island.						
Meat-export slaughterhouses—						
Auckland	34,838	15,651	41,693	31,276	18,876	58,223
Poverty Bay - Hawke's Bay ..	12,967	646	100,464	27,332	109,416	9,578
Taranaki-Manawatu	25,929	2,302	38,778	18,751	94,130	43,542
Wellington - Wairarapa ..	10,460	754	52,284	18,562	92,500	8,530
Totals	84,194	19,353	233,219	95,921	314,922	119,873
Abattoirs	21,744	5,872	58,192	33,706	4,841	18,920
North Island totals ..	105,938	25,225	291,411	129,627	319,763	138,793
South Island.						
Meat-export slaughterhouses—						
Nelson-Marlborough	164	19	2,245	1,186	27,674	3,071
Canterbury	3,255	2,779	150,197	127,397	539,768	8,502
Otago-Southland	3,768	96	83,657	68,269	354,049	1,923
Totals	7,187	2,894	236,099	196,852	921,491	13,496
Abattoirs	11,077	2,541	44,789	23,628	4,406	4,918
South Island totals ..	18,264	5,435	280,888	220,480	925,897	18,414
Dominion.						
Meat-export slaughterhouses ..	91,381	22,247	469,318	292,773	1,236,413	133,366
Abattoirs	32,821	8,413	102,981	57,334	9,247	23,838
Grand totals	124,202	30,660	572,299	350,107	1,245,660	157,207
Grand total for May-June, 1937..	132,663	32,969	487,619	270,222	1,385,107	172,422
Grand total for May-June, 1936..	110,882	31,907	538,706	294,916	1,537,977	164,289

The Farm Home and Kitchen.

Contributed by Department of Home Science, University of Otago.

Variations for Mutton.

IN the sheep's carcass there are the good and less good portions. By good is meant the more easily cooked and the more tender parts. Most people know how to deal competently with these parts—namely, legs and loins and part of the shoulder. Their tenderness makes it possible to roast them, and as long as the principle of a very hot oven for the first half-hour and then a slow one for the rest of the time is followed all will be well. Frying is also possible, and chops and cutlets are tender and appetizing when given a quick searing in the pan and then a more slow cooking until done. French or crumbed cutlets are cooked similarly, but in deep, hot fat.

Flavour an Asset.

The flavour produced by frying and roasting is a very important asset when dealing with any rather flavourless meat, or when mutton is so much the everyday fare that one is getting tired of it. It increases the appetizing value of meat. This must be borne in mind, and it will be referred to again when discussing stews and casseroles. It is good to have a change sometimes, however, and this is one reason why a dish of boiled mutton served with a tasty caper or parsley sauce is often a welcome change.

Another pleasant variation, especially in summer, is to corn or pickle the leg and to serve it boiled. The flavour of a mild, well-spiced pickle is a great improvement on the rather "high" flavour sometimes associated with mutton in very hot weather, or that of too-fresh meat that has been cooked very soon after killing to avoid any deterioration.

On the other hand, the so-called inferior parts are frequently the best flavoured, and most discriminating persons are glad to use them. The breast, the flap, the neck, and the neck ribs are generally rather a problem. In lamb and very tender mutton they can be roasted, but the meat is so scanty and the bones so many that it is not really a satisfactory dish. Therefore, we fall back on stewing and soup-making, both of which are excellent.

Developing the Flavour.

Every one has recipes for Irish stew, haricot mutton, and Scotch broth. These can be watery, flavourless, and obviously inferior to the roast, but there is no reason why they should be any less popular if the essential goodness and flavour of the ingredients are developed by cooking. Flavour can be introduced by frying the well-floured meat before it goes into the stew and by frying the onions and other vegetables. It takes a little time, but the improvement in flavour is worth the extra trouble.

It always pays to cut away as much of the bone and fat as possible before cooking stews, as it will save time in cooking. The bones can go into the stock-pot, and the fat can be rendered down. Any excess of liquid and the fat that has risen to the top must always be poured off into a stock-pot or skimmed off.

Modifications of stews are casseroles and curries. There are few things nicer than a really well-made curry. Unfortunately, most people add the curry-powder last, and therefore do not produce the best results. The following are the ingredients for and the method of making curry so that the flavour penetrates right through the meat:—

Mutton Curry.

Sufficient mutton to give 2 lb. or 3 lb. of lean meat.
1 tablespoon flour.
A little butter.
Dripping.
3 or 4 shallots or 1 spanish onion.
A small clove of garlic.
½ pint of stock.
1 dessertspoon curry-powder.
Juice of half a lemon.
Pepper and salt.
Red-currant jelly.

Method.—Melt a little fat in a saucepan, add the cut-up shallots or onions and garlic (the size of a pea, very finely chopped). Fry them, and add one dessertspoonful or more of curry-powder. Cook these slowly for about seven minutes to remove the raw taste, and then add stock and cook a few minutes before pouring into a saucepan. Meanwhile, strip as much fat as possible from the mutton until about 2½ lb. of lean mutton is left. Cut it up into cubes, roll them in flour, and fry in a little dripping, turning over so that all sides will be browned. Add this to the stock, and simmer gently for two or three hours until the mutton is tender, adding more stock if it becomes dry. Season to taste with pepper and salt, and add red-currant jelly and lemon-juice before serving.

As a substitute for the red-currant jelly many people prefer a flavouring of apple and sultana in the curry. A large, tart apple shredded and cooked with the curry and a quarter of a cup of sultanas will give a very satisfactory flavour.

Twelve O'clock Pie.

This is a good way of using up odd pieces, and is more popular with men than are stews.

Method.—Stew together the scrag end of the neck and any pieces of breast or neck ribs, &c., with carrot and onion, and any other well-flavoured vegetable, such as celery-leaves. Boil a saucepan of potatoes. When the mutton is tender, pour off most of the stock and fat into the stock-pot, and lift out the meat and bone. Trim the edible part away from the bones and the excess fat, and then put it into a pie-dish with layers of the carrot and onion and nearly all the cooked potatoes cut up into convenient sizes. Season well. Cream up the remainder of the potatoes and make them into a crust for the pie, and bake this until it is nicely browned. If seasoned nicely, this is a very satisfactory and economical dish.

Casserole of Mutton.

Casserole can also be made from pieces or from a shoulder of mutton.

Method.—Pound flour into 3 lb. of inexpensive meat. Cut it into slices and fry it. Put the pieces into a casserole and barely cover them with hot water. Put the lid on and place the casserole in a moderate oven for two hours. Then add one cup of carrots and one cup of potatoes cut into cubes and one-quarter of a cup or more of sliced onion. Other vegetables may be added as desired, tomato puree being especially good. Sprinkle over two teaspoons of salt and some pepper. Re-cover and cook until the vegetables are tender, which will be about one hour. If this quantity is insufficient for your family, use larger quantities and make your casserole in a meat-dish, inverting another one over it to act as a cover, or placing a clean oven-tray on top of it.

Mincing Raw Meat.

Many people do not favour mincing raw meat, as it is rather a messy business, but mincing is one of the principle methods of making less-tender cuts of meat tender. Another advantage of meats so treated is that they can be cooked quickly and economically. There is no reason why minced meat should not be cooked like the most tender fillet steak or loin of lamb chop. The only reason for difference in treatment was the presence of more tough connective tissue in the one than in the other, and this has been overcome by mincing.

Hence, raw mutton from any part of the carcass can be minced and then made into cakes and grilled or fried just like a chop. Do not leave too much fat on the meat; nor, on the other hand, remove it all, as the result should be not too greasy nor too dry. To keep in the juices it is desirable to dip the cakes in egg or to combine them with egg, but this is not necessary. Seasonings are, of course, added.

The dishes that can be made with minced raw mutton are as follows:—

Mutton Hamburger.

Method.—Mince the mutton, using the medium, coarse knife on the mincer. For every two cups of minced mutton add one cup of breadcrumbs, one tablespoon of parsley, and salt and pepper. Cut seven slices from a side of bacon. Form the meat mixture into seven little cakes about ¾ in. thick and wrap them around with the strip of bacon, skewering it on with toothpicks or sharpened match sticks. Place on a greased baking dish and bake in a hot oven at 450° F. for eight to ten minutes. If desired, slices of onion can be pre-cooked in the baking-dish and the cakes placed on these. Serve with tomato-sauce, baked potatoes, or kumeras, and any green vegetable.

The minced mutton can, of course, be served as "mince"—*i.e.*, fried first and then simmered gently in some well-seasoned stock and served with vegetables. Another use is in combination with rice, macaroni, or spaghetti. The rice or other cereal is first cooked and strained, and then mixed with a little butter and tomato puree or some sauce to give it a flavour. The mince, which has been fried with some onion and is stewed tender, is then stirred into the cereal. It can be served immediately or, if preferred, turned into a greased pie-dish, sprinkled with buttered crumbs and baked till brown.

Use of Stuffing.

Many people stuff the boned shoulder. Stuffing the breast may be suggested as a possible way of making a meal out of a small piece of bony meat. Mince up any odd pieces (the shank, &c.), and crack the breast bone between the ribs. Next, cut a pocket close along the ribs and dust it with salt and pepper. Make a stuffing of the minced mutton and greased bread-crumbs, flavoured with chopped parsley and celery, or mint and seasonings. Stuff into the pocket and bake for half an hour at 450° F. (very hot) and for one hour to one hour and a quarter at 300° F. (slow).

Baked onions go well with stuffed mutton. Use large onions, and cut them in half lengthwise and simmer gently until half cooked. They can then be baked in the pan around the meat, or, if there is any stuffing over, lift out the centre leaves of each half onion, chop them up, and add them to the remaining stuffing. Then fill the onion shells with the stuffing, and bake, as described, around the meat.

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Ways of Cooking the Cheaper Cuts of Meat.

THERE is always a demand for the more easily cooked and more tender cuts of meat. No one has as yet been able to breed an animal which possesses no firm muscles, although pigs fattened in pens, having little opportunity to take exercise, keep their muscles soft and flabby and ultimately become tender pork. But when the butcher comes to cut up the carcass of a sheep or a bullock there are, in addition to the tender, easily cooked joints, parts which are fibrous, bony, or tough. As the main demand is for the tender joints, roasts, stakes, or chops, the price of these rises, and as there is less demand for the forequarter or brisket of mutton, or the leg or neck of beef, the price of these falls.

It is true that the more expensive parts often require less cooking than the cheaper ones and may also be more free from waste, such as excess fat, bone, or gristle, but even when this is taken into account the cheaper cuts still remain more economical than the dearer ones. Most women would be surprised at the range of prices if they had an opportunity to see the prices for all cuts of beef, mutton, veal, and pork listed out.

Two Drawbacks.

Two things usually make the cheaper cuts of meat unappetizing. One is their toughness, due to the presence of much connective tissue, and the other to their dryness, due to absence of fat in the tissues.

The first treatment to overcome these two drawbacks is *long, slow, moist* cooking. The connective tissue throughout meat is like tiny strands of the gristly substance that is to be found in large quantities on shins of beef and mutton. If shins are boiled this becomes soft, jelly-like, and tasty, and if the shin is roasted it becomes rubbery or dry and crisp. You will now appreciate why long, slow, moist cooking is needed to make meat that is full of fibrous tissue tender and palatable.

Consequently, stewing, casserole-cookery, and pot-roasting are the best suited to give tenderness to the tougher cuts. This, too, will give them a juicyness which dry roasting or frying will not.

Pot Roasting.

To pot roast, select a piece of meat weighing about 4 lb. to 6 lb. from the chuck ribs or the round or rump. Wipe it with a damp cloth, and rub in salt and pepper or flour. Using a heavy saucepan, brown the meat on all sides in about three tablespoons of beef dripping. Slip a low rack under the meat, add half a cup of water, cover *tightly*, and let it simmer until tender, which will be in about three hours. After lifting the meat out save the stock in a basin, brown some flour in a little fat and make a gravy, using the stock after skimming off the fat. If desired, carrots, celery, onions, potatoes, or turnips may be cooked in the pot with the roast. Add these about an hour before the meat will be cooked.

If the bundles of connective tissue which make the meat tough can be broken up finely, heat—and especially moist heat—can penetrate and soften them more easily. Consequently, if one minces the tougher cuts before cooking them one can drill and bake the minced meat as though it had been tender to start with. Lean meat is best for mincing, and therefore select the lower part of the round, the forepart of the chuck, the lean section of the brisket, and other well-flavoured small pieces of lean. Fat can be added after mincing in the form of bacon-fat, suet, or chopped bacon ends.

Meat Loaf.

Meat loaf is one of the most popular minced-meat dishes. It is made as follows :—

Meat, 2 lb.
Salt, 1 teaspoon.
Egg, 1.
Parsley (chopped), 1 tablespoon.
Breadcrumbs, 1 cup.
Onion-juice, 1 teaspoon.
Pepper, ½ teaspoon.
Milk or stock, ½ cup.
Bacon, 2 rashers.

Method.—Wipe the meat with a damp cloth and mince it with the bacon. Add seasoning, mix well, and gradually add the crumbs, the well-beaten egg, and the milk. Place in a well-greased pan, and put small pieces of dripping or strips of bacon on top. Bake forty minutes in a moderate oven (350° Fahrenheit). Baste occasionally with one tablespoon of fat melted in one cup of boiling water. Serve with gravy or sauce made from tomato puree.

A mixture of soft breadcrumbs and raw, minced beef or mutton in the proportion of two parts of meat to one of crumbs can be patted into cakes about ¾ in. thick and fried or grilled like steak. Be sure to season it well with salt, pepper, parsley, and butter.

It needs only a little more skill to cook the cheaper cuts than is needed to cook the more tender and more expensive ones. Many of the cheaper parts, however, have far the better flavour, and for that reason alone are often prepared. To make a success of the cheaper cuts, remember that what is needed is *long, slow, moist* cooking.

Cooking Chart for Meat.

Boiling.

Method.—Have the water boiling before the meat is placed in the saucepan. Boil for five or ten minutes, and then reduce the heat and simmer for the remainder of the cooking period.

Beef, mutton, and poultry : Twenty minutes to the pound, and twenty minutes over. Veal and ham : Twenty-five to thirty minutes to the pound, and ninety minutes over.

Roasting and Baking.

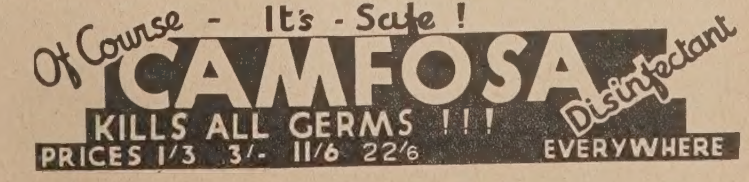
Method.—Place the meat in a hot pan in an oven 450° Fahrenheit. After fifteen to twenty minutes reduce the heat to 350° or 375° Fahrenheit and continue at that temperature until cooked.

Mutton and beef : Fifteen or twenty minutes to the pound, and fifteen or twenty minutes over. Veal and pork : Twenty-five minutes to the pound, and twenty-five minutes over.

Grilling or Broiling.

Method.—Have a griller or pan very hot in order to sear the outside surface. Then, after two or three minutes, reduce the heat.

Steak : 1½ in. thick, fifteen or eighteen minutes. Steak or chop : 1 in. thick, eight or ten minutes.



Recommended Recipes.

Wholemeal Gems.

Wholemeal, 1 cup.
Flour, 1 cup.
Milk, 1 cup.
Egg, 1.
Salt, 1 teaspoon.
Butter, 2 tablespoons.
Baking-powder, 5 teaspoons.
Sugar, 2 tablespoons.

Oatmeal Gems.

Cooked porridge, 1 cup.
Flour, 1½ cups.
Milk, ½ cup.
Egg, 1.
Salt, ½ teaspoon.
Butter, 2 tablespoons.
Baking-powder, 4 teaspoons.
Sugar, 2 tablespoons.

Bran Gems.

Clean bran, 2 cups.
Flour, 1 cup.
Baking-powder, 3 teaspoons.
Milk, 1½ cups.
Eggs (beaten), 2.
Butter (melted), 1 tablespoon.
Raisins (seeded), ¾ cup.
Sugar, ½ cup.
Salt, 1 teaspoon.

General Method for Making Gems.—Sift white flour, baking-powder, and salt, and add to other dry ingredients. Then add eggs slightly beaten, milk, and melted butter. Bake in greased muffin tins or gem irons in moderate oven twenty to twenty-five minutes.

Stuffed Monkeys (Biscuit).

Butter, 6 oz.
Sugar, 8 oz.
Egg, 1.
Cinnamon, 3 teaspoons.
Flour, 12 oz.
Soda, 1 teaspoon
Cream of tartar, 2 teaspoons } or 4 teaspoons baking-powder.

Method.—Cream butter and add sugar gradually. Beat egg and add to creamed mixture and beat thoroughly. Finally add flour, &c. Roll out and cut into required shapes.

Filling.—Mince sultanas, lemon peel, and nuts together and spread between two biscuits. Press together. Bake at 300° F.

Candied Peel.

Method.—Save the rinds of four thick-skinned oranges or grapefruit by placing them in salt water to soak. Drain and cover with fresh boiling water. Boil until so tender you can pierce the skins with a straw. Remove and cut into ¼ in. strips. Place one cupful of sugar and half a cupful of boiling water in a saucepan and bring to the boil. When sugar is melted, add the strips and cook until all the syrup is absorbed by the peel. Spread some sugar on an ashet and distribute the strips upon this, rolling them individually in the sugar. Cool, and serve as a sweet for dessert.

Mint Jelly.

Method.—The basis for mint jelly is ordinary apple jelly, so first boil up greenish apples and extract the juice. Wash and chop mint leaves, and add quarter of a cup of sugar to each cup of chopped mint. Let this stand overnight, and in the morning heat it to boiling point and strain. Add two tablespoons of this flavouring to each quart of apple-juice, and add sugar in the proportion of two-thirds sugar to one of juice. Colour green and cook quickly until it sets—usually from 5 to 15 minutes.

Marmalade.

Poorman oranges, 7.
Lemons, 2.
Water, 10 pints.
Sugar, 10 lb.

Method.—Mince oranges and lemons. Add water, and soak overnight. Next day boil for one hour. Then add sugar and boil until the mixture jellies—usually half to three-quarters of an hour. Pour into sterilized jars and seal. Makes three and a half to four 2-quart jars.

Grapefruit Marmalade.

Grapefruit (large), 1.
Lemon, 1.
Sugar.
Water, 10 cups.

Method.—Wash lemon and grapefruit; cut in pieces, remove pips, and put through mincer. Add water, and soak overnight or not, as preferred. Boil quickly for one hour. Measure liquid, add cup for cup sugar, boil until the mixture jellies (usually half to three-quarters of an hour). Pour into sterilized jars, and seal.

Simnel Cake.

Butter, ¾ lb.
Sugar, ¾ lb.
Seeded raisins, 8 oz.
Flour, 1 lb.
Treacle, 1 teaspoon.
Baking-powder, pinch.
Currants, 12 oz.
Peel, 1 oz.
Cherries, 2 oz.
Valencias, 6 oz.
Eggs, 8.

Method.—Cream the butter and sugar, add eggs and treacle, then flour and baking-powder, lastly prepared fruit; put half the mixture into tin. Roll out half the almond paste size smaller than the tin; place on top of mixture; then put the remaining mixture on top. Bake in slow oven three or four hours. When cooked, roll remaining almond paste in a ring and place around top of cake; prick the almond paste, and bake in the oven a few minutes. When cold, fill centre with water icing and decorate with crystallized fruits.

Almond Paste.

Ground almonds, ½ lb.
Icing sugar, ½ lb.
Castor sugar, ½ lb.
Flavouring.

Method.—Mix all together; after sieving sugar, mix to a very stiff paste with beaten egg.

Crayfish Savouries.

These consist of pieces of crayfish broken into suitable sizes for a serving, each lying in a curling lettuce-leaf. About one-half tablespoon of good mayonnaise dressing and a garnish of paprika adds interest in flavour and appearance.

Oyster Patties.

Oysters chopped, 1 dozen.
Thick white sauce, 1 cup.
Pastry shells.
Nutmeg, ¼ teaspoon.
Lemon-juice, 1 teaspoon.
Salt and pepper.

Method.—Cook the white sauce and add the chopped and bearded oysters, and cook over hot water for five minutes. Remove from the heat and cool. Fill the patty cases. Before serving, place in the oven for a few minutes to heat thoroughly.

Founders of Modern Agriculture, No. 8.

J. W. Woodcock, Crop Experimentalist.

Jean Baptiste Boussingault.

PRIOR to the year 1834 the advances in agricultural chemistry were based on experiments conducted either in the laboratory or in small plots. By these methods great progress had been made by de Saussure and others in bringing to light many new ideas regarding the relationship of plants to the soil. To Jean Boussingault (1802–1887), however, is ascribed the credit for having introduced a method of carrying out experiments in the field which was to lay the foundation of a new agricultural science. He can therefore be regarded as the founder of field experiments.

Experiments at Bechelbronne.

Boussingault was born in Paris, and was brought up under conditions of extreme poverty. Even as a boy he showed an intense interest in chemistry, and later, after spending some years in South America, he returned to France and became Professor of Chemistry at Lyons. His father-in-law had a farm at Bechelbronne, and it was through this connection with farming that Boussingault became interested in agriculture.

He began a series of field experiments on this farm in 1834, and studied the effect of a rotation of crops. Working by the quantitative methods of de Saussure, he weighed and analysed the manures used, the crops obtained, and at the end of the rotation he drew up a statement showing how far the manure had affected the crop and how far air, rain, and soil had been drawn upon in producing the essentials for crop-production.

He showed that quite an appreciable amount of nitrogen was gained by the soil when the newer rotations were adopted, but not where only wheat was grown. This led to the conclusion that some plants were able to obtain nitrogen from the atmosphere, whereas others could not do so, and the importance of leguminous crops in the fixation of atmospheric nitrogen was brought to light.

Beginning of Field Experiments.

Boussingault's work dealt with the composition of crops at different stages of growth and with many soil problems hitherto obscure. The advantages of his results were that they were secured under field conditions and not under the artificial conditions of the laboratory. Not only did these researches pave the way to more exact knowledge of plant nutrition, but the technique which this worker adopted opened up a new field of investigation.

Unfortunately, the experiments at Bechelbronne were not continued, but no doubt they served as an incentive for Lawes and Gilbert to establish experiments on the same general lines at Rothamsted a few years later.

A picturesque view of a portion of Ruakura Farm Training College, which is being developed as an up-to-date experimental station.

Dairy-produce Export Prices.

BY the Dairy-produce Export Prices Order (No. 2), 1937, Amendment No. 1, the prices paid for dairy-produce acquired by the Crown for export during the 1937–38 export season in terms of the Primary Products Marketing Act, 1936, are increased by 0·41d. per pound in the case of butter and 0·21d. per pound in the case of cheese, and represent an additional payment to dairy companies for the 1937–38 season's make of dairy-produce of approximately £800,000. The increased prices apply to exported dairy-produce until a new Export Prices Order for the 1938–39 season is made.

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